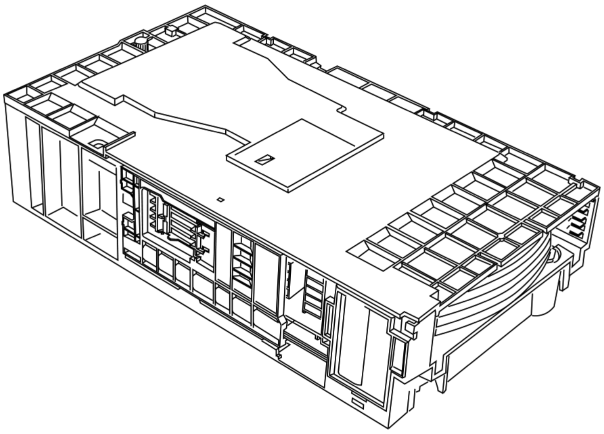
ORDER NO. MD0509368C0
A6

Service Manual

Mechanism Unit

CRS1



⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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Panasonic

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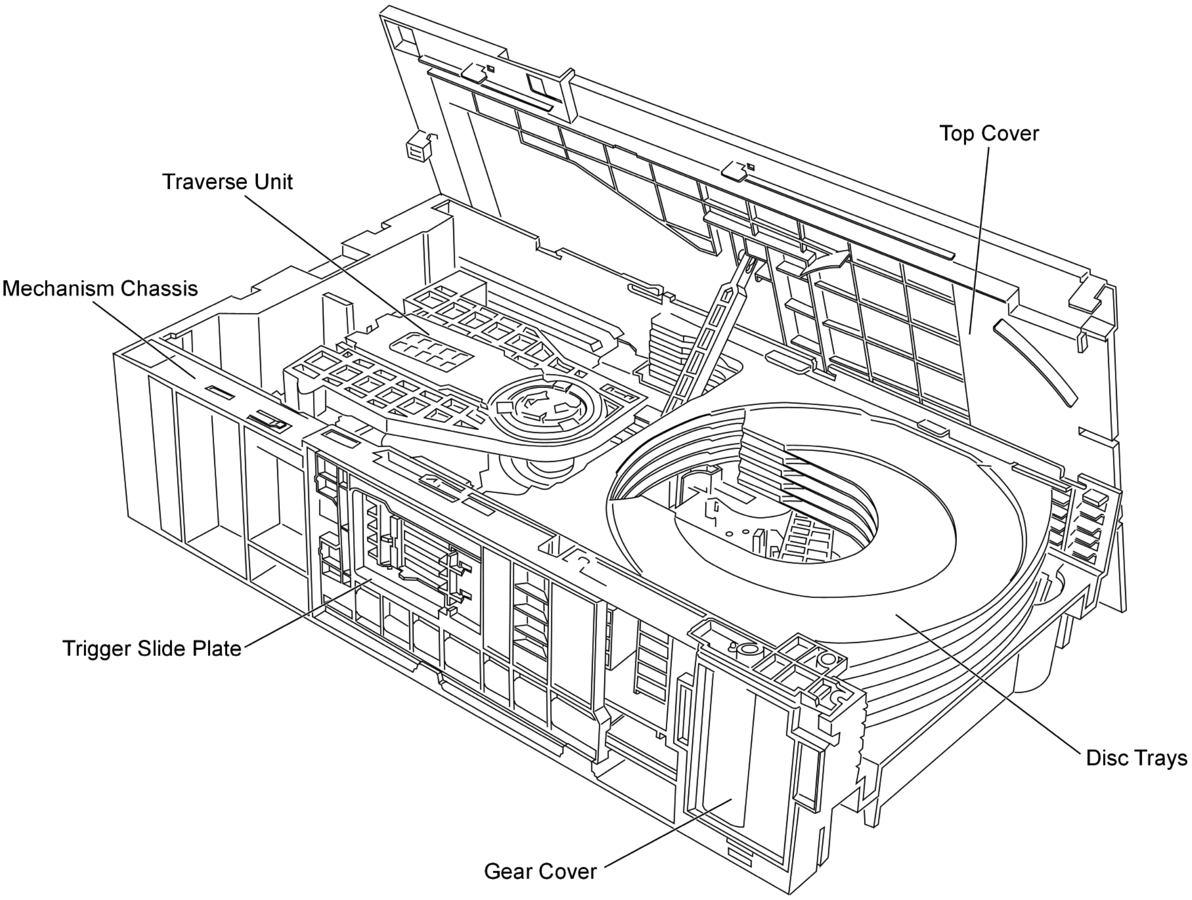
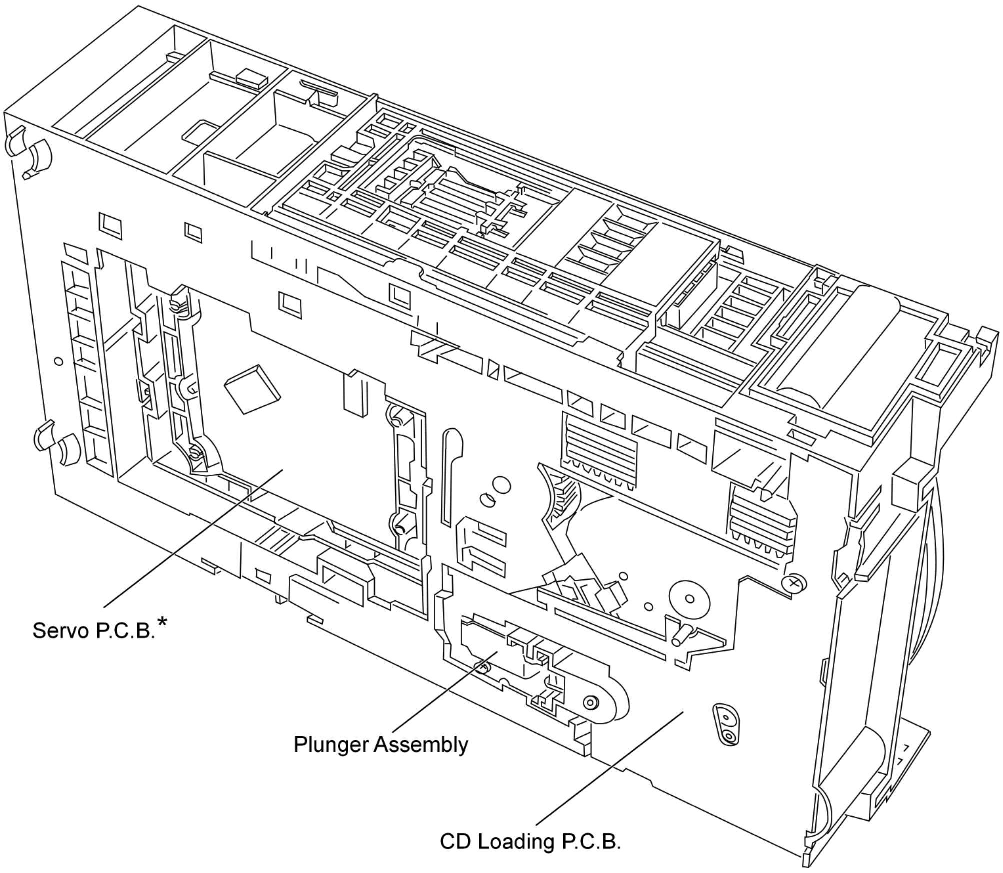
1 Mechanism Overview

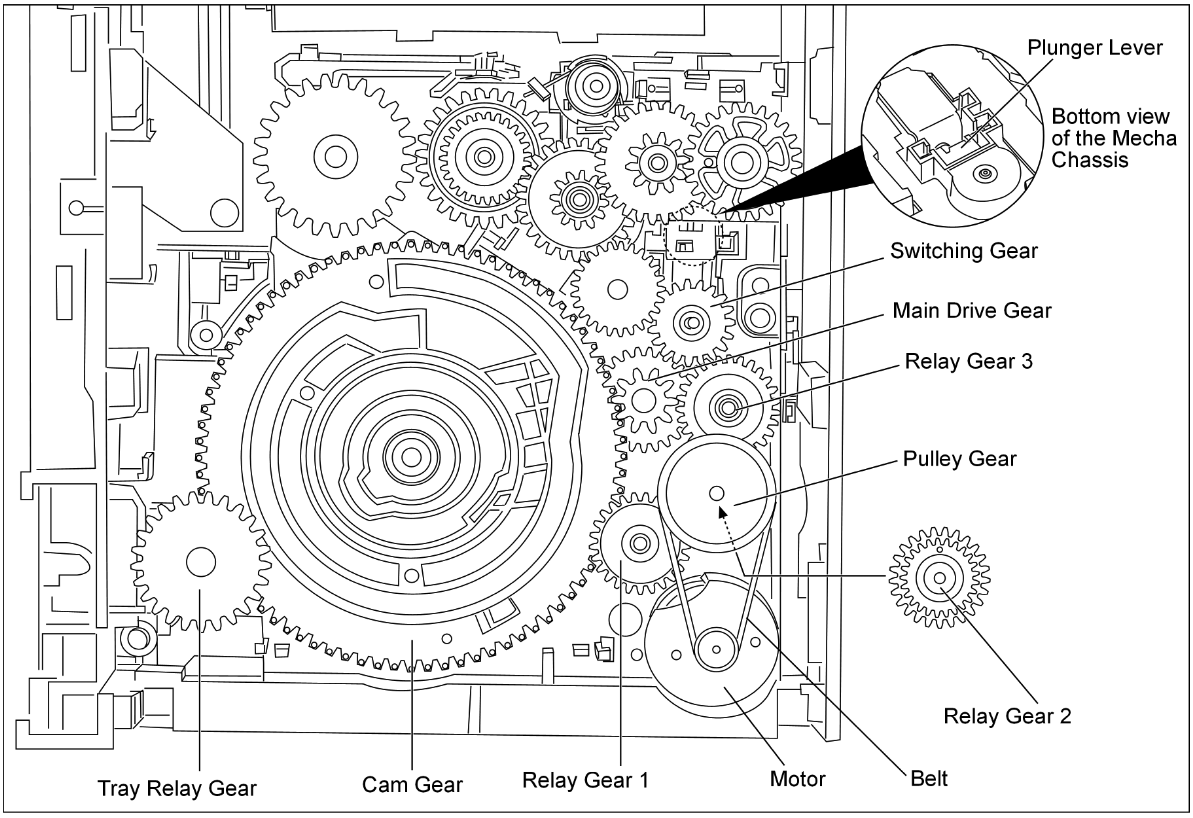

Top Cover
Traverse Unit
Mechanism Chassis
Trigger Slide Plate
Disc Trays
Gear Cover

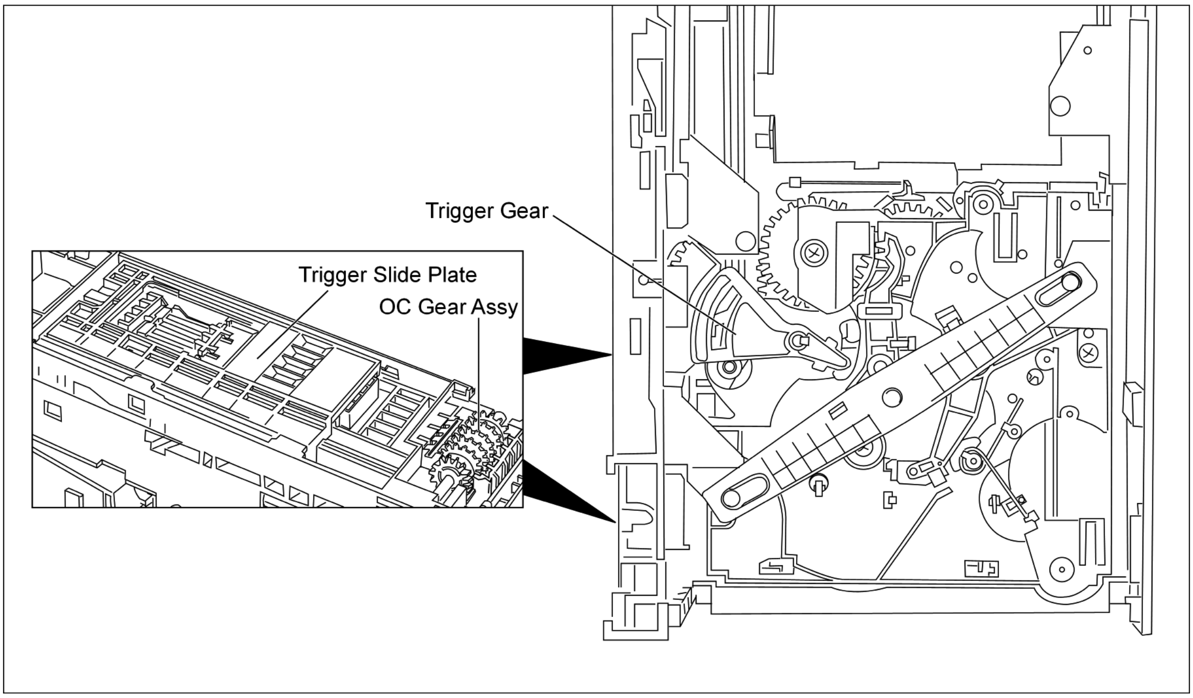

Servo P.C.B.*
Plunger Assembly
CD Loading P.C.B.

* Illustration for CD Servo P.C.B. (Applied models: SA-AK240/340/640 series)

2 Mechanism Drive Unit

2.1. Tray Open/Close and Multi-Discs Change operations


Plunger Lever
Bottom view of the Mecha Chassis
Switching Gear
Main Drive Gear
Relay Gear 3
Pulley Gear
Relay Gear 2
Tray Relay Gear
Cam Gear
Relay Gear 1
Motor
Belt


Trigger Gear
Trigger Slide Plate
OC Gear Assy

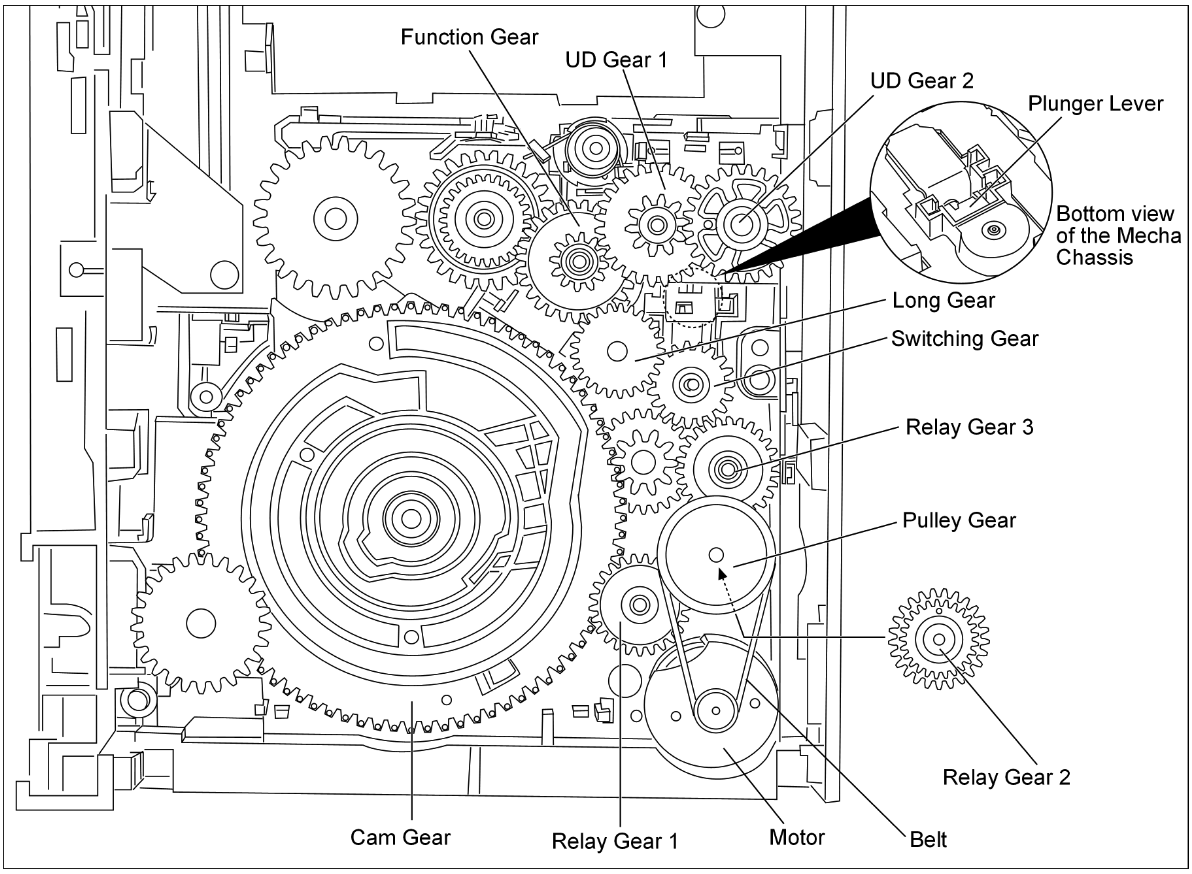
2.1.1. Description of tray open/close and multi-discs change operations

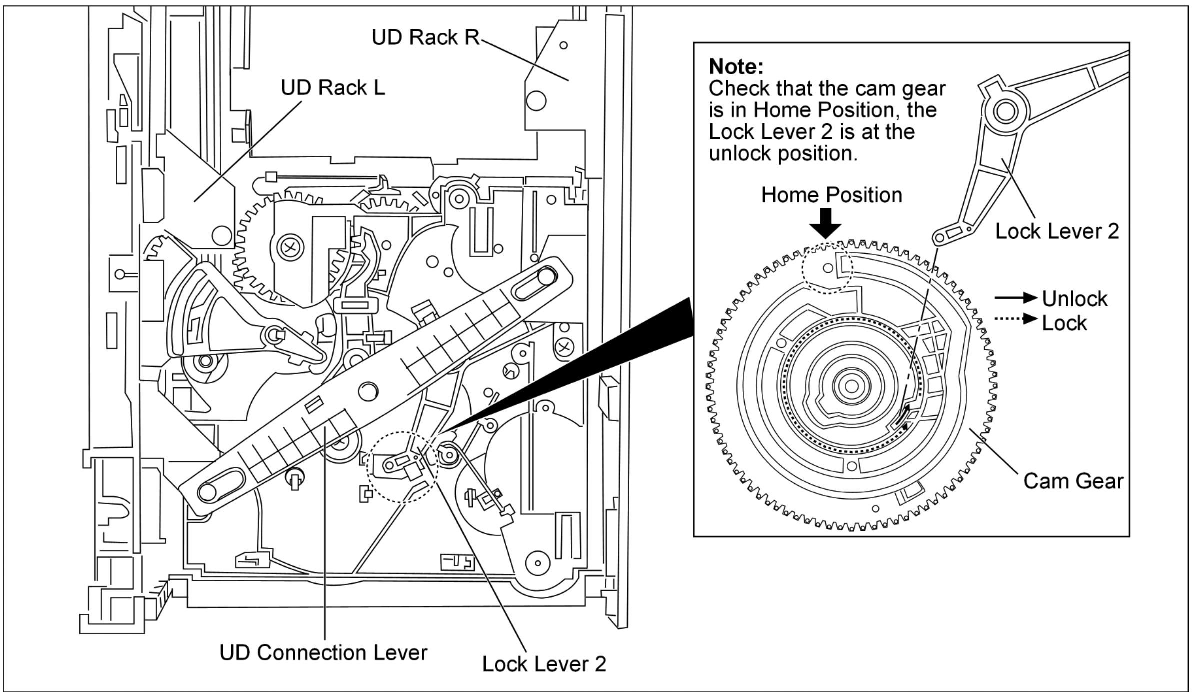
1. The motor turns in the clockwise direction and the rotation is transmitted via the belt, the pulley gear also turns clockwise.
2. The relay gear 1 turns counterclockwise.
3. The relay gear 2 turns clockwise.
4. The relay gear 3 turns counterclockwise.
5. The switching gear at down position turns clockwise (up/down position functioned by the plunger lever).
6. The main drive gear turns counterclockwise.

7. The cam gear turns clockwise, which is engaged with the trigger gear and slide plate, are driven, causes the tray lock lever unlock.
8. The tray relay gear turns counterclockwise, which is engaged with the OC assy, is driven.
9. The movement of the OC assy releases the disc trays.

(The operation of the disc trays closed is the opposite of that for opening of disc trays.)

2.2. Disc Selection operation


Function Gear
UD Gear 1
UD Gear 2
Plunger Lever
Bottom view of the Mecha Chassis
Long Gear
Switching Gear
Relay Gear 3
Pulley Gear
Relay Gear 2
Cam Gear
Relay Gear 1
Motor
Belt


UD Rack R
UD Rack L
UD Connection Lever
Lock Lever 2
Home Position
Lock Lever 2
Unlock
Lock
Cam Gear

Note:
Check that the cam gear is in Home Position, the Lock Lever 2 is at the unlock position.

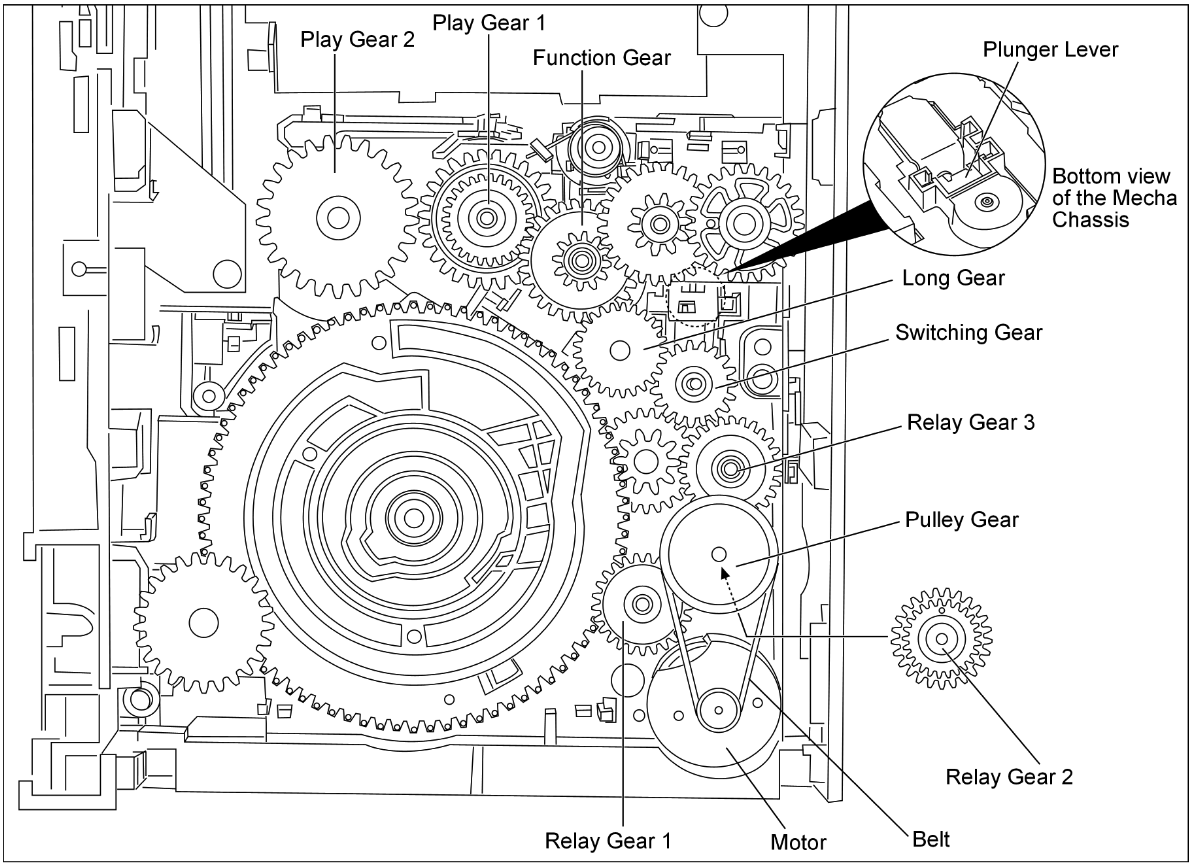
2.2.1. Description of disc selection operation

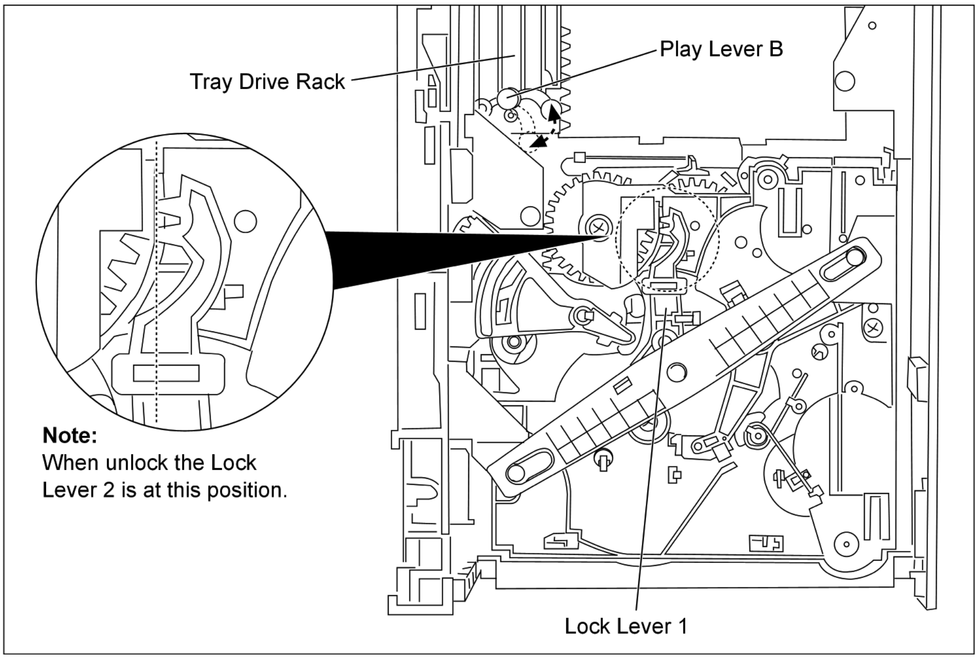
Note: Check that the cam gear is in “HOME” position.

1. The motor turns in the clockwise direction and the rotation is transmitted via the belt, the pulley gear also turns clockwise.
2. The relay gear 1 turns counterclockwise.
3. The relay gear 2 turns clockwise.
4. The relay gear 3 turns counterclockwise..
5. The switching gear move up turns clockwise (up/down position functioned by the plunger lever).
6. The long gear turns counterclockwise.
7. The function gear moved up turns clockwise.
8. The UD gear 1 turns counterclockwise.
9. The UD gear 2 turns clockwise engaged with the UD rack R drives the UD connection lever turns clockwise, UD rack L, is driven to move the traverse deck assembly up.

(The operation of the traverse deck assembly down is the opposite of that for the traverse deck assembly up.)

2.3. Play/Stop operation


Play Gear 1
Play Gear 2
Function Gear
Plunger Lever
Bottom view of the Mecha Chassis
Long Gear
Switching Gear
Relay Gear 3
Pulley Gear
Relay Gear 2
Relay Gear 1
Motor
Belt


Play Lever B
Tray Drive Rack
Note:
When unlock the Lock Lever 2 is at this position.
Lock Lever 1

2.3.1. Description of play/stop operation

Note: Check that the Lock Lever 1 is unlock.

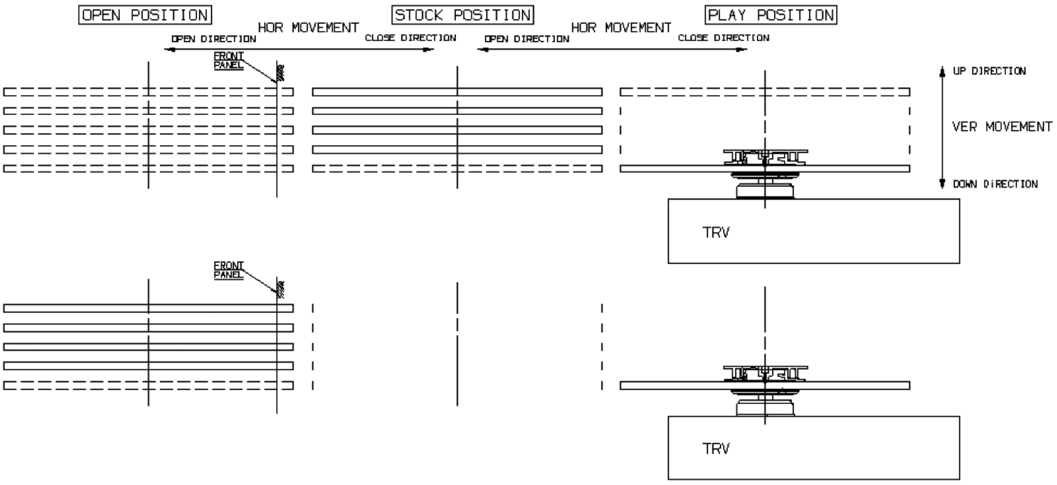
1. The motor turns in the clockwise direction and the rotation is transmitted via the belt, the pulley gear also turns clockwise.
2. The relay gear 1 turns counterclockwise.
3. The relay gear 2 turns clockwise.
4. The relay gear 3 turns counterclockwise.
5. The switching gear move up turns clockwise (up/down position functioned by the plunger lever).
6. The long gear turns counterclockwise.

7. The function gear move down turns clockwise.
8. The play gear 1 turns counterclockwise.
9. The play gear 2 turns clockwise engaged with the tray drive rack and tray catch lever to push in the disc trays.
10. Play lever B engaged with the traverse deck assembly’s play lever A, causes slide plate move towards to the play position.

3 Mechanism Operation Description

3.1. General Feature

- This is a five disc changer mechanism for CD/DVD. The outline figure is shown below.



- The mechanism has **"CHANGE WHILE PLAY"** function. It open other trays for disc exchanging while one tray is at PLAY position performing recording or reproducing.
- The mechanism can quickly change all trays with **"CHANGE ALL"** function. All trays can be move to OPEN position with one operation.
- There is no sensor to indicate presence of disc on any tray.

3.2. Hardware composition

- Below is the hardware components of the mechanism

Name	Function
Open Switch (OPEN-SW)	The switch is used to detect normal tray opening
	The switch is used for detect tray being manually push/trigger when full open
Home Switch (HOME-SW)	Is used to detect cam gear home position
Close Sensor (CLOSE-SENSOR)	Used for normal single tray closing
	Used to detect cam gear rotate to Play Driving position
Play Switch (PLAY-SW)	Detect TRV clamping complete position
Stocking Switch (STOCK-SW)	Detect tray completely transfer for play position to stocking positi
UD Sensor (UD-SENSOR)	Detect TRV vertical movement position
Top Switch (TOP-SW)	Detect a default position of TRV vertical movement position
Driver IC	To drive Motor
Motor	Main driving source for changer
Plunger	Switching the driving source from motor to: 1. Tray open/close 2. Drive tray to play/stock position and TRV vertical movemen

3.3. Mechanism Operation

- This mechanism has the following state:
  1. Driving of a tray to open/close
  2. Up/down operation of a traverse performs a state changes of tray.

By using the plunger to lift/release of a switching gear, and the cam gear to lift/release the function gear the motor can be link to several gear trains to perform various operations.

- The functions that can be perform in this mechanism are described as below:

Condition	Explanation
Open current playing tray	The state to change current playing disc. All tray will be open at once and current tray at PLAY position will be expose.
Open All	The state where all trays being driven to OPEN position. The disc can be taken in or out from tray to tray by close tray one by one from top to bottom.
Stock	The state where the trays are stored in STOCK position
Play	The state where one of the tray 5 trays is being driven to PLAY position and clamped by traverse unit

Condition	Explanation
Play & Open Tray-*	The state where one of the tray is in playing position performing recording or reproducing, other trays can be used (OPEN position) for disc exchanging without stopping the recording or reproducing process.
Change	The state when one of the opened tray being driven from OPEN position to STOCK position and other opened trays remain still at OPEN position.
Close All	The state where all open trays will being driven from OPEN position to STOCK position, one by one from top to bottom

Note: * represent tray number (from 1 ~ 5)

- Logics of motor control:

Action	CW	CCW	Plunger
Tray Opening	H	L	L
Tray Closing	L	H	L
Cam move from Home Position to Play Driving Position	H	L	L
Cam move from Play Driving Position to Home Position	L	H	L
Drive tray to PLAY position	H	L	H
Drive tray to STOCK position	L	H	H
UD base moving upward	H	L	H
UD base moving downward	L	H	H

Notes :

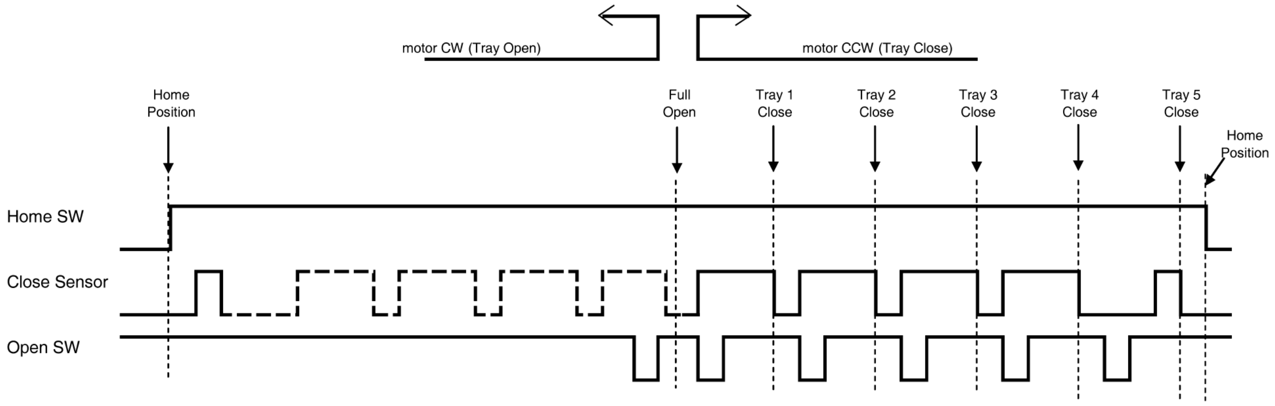
CW/CCW : Motor direction control (CW : clockwise, CCW : Anti-clockwise)

Plunger : Solenoid Control (H : ON = Activation)

- Cam gear in the mechanism use for opening/closing of trays and lifting a function gear to link to gear train that drive UD base moving up/down. When cam gear is being driven to play driving position, the function gear will be bring down to link the gear train that drive tray to and from STOCK position and PLAY position. Below are the relation between mechanism function and cam gear movement and position

Motor Direction	Plunger Unit	Cam gear movement/position	Function
CW	Release	Home SW → rotate CW	Trays Open
CCW	Release	Rotate CCW → Home SW	Trays Close
CW	Release	Home SW → close sensor 1st L-H signal	Cam gear move from Home Position to Play Driving Posi
CCW	Release	Close sensor 1st (H → L) signal → Home SW	Cam gear move from Play Driving Position to Home Position
CW	Up	Cam Stop at Home Position	UD base moving from bottom to top
CCW	Up	Cam Stop at Home Position	UD base moving from top to bottom
CW	Up	Cam Stop at Play Driving Position	Tray move from STOCK to PLAY position
CCW	Up	Cam Stop at Play Driving Position	Tray move from PLAY position to STOCK Position

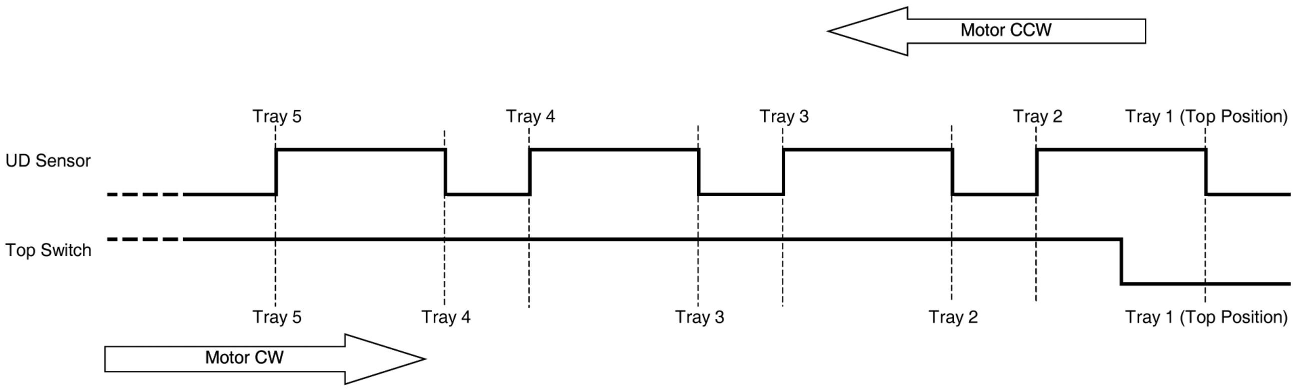
- Cam gear rotation direction, switch and state changes is show in figure below:



- The movement of UD base (vertical up/down) and driving of tray(s) between STOCK position and PLAY position is only enable when plunger ON (lift up the switching gear to link driving source to the both gear train). Only one gear train can be driven at one time, the selection of either gear train is depending on cam gear position. Below are figure showing the operation of motor driving direction and its function carry out.

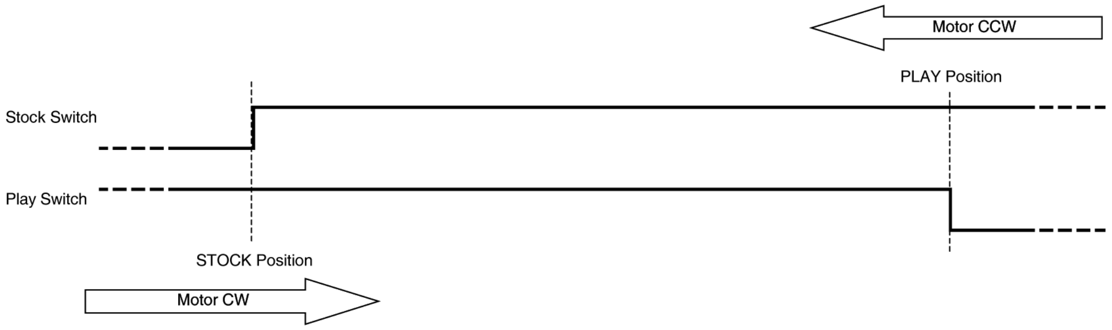
	Cam Gear	
Motor	**Home Position (UD Driving Position)**	**Play Driving Position**
CW	UD base move upwards direction 5→1	Stock → Play
CCW	UD base move downwards direction 1→5	Play → Stock

- For driving UD base up/down the cam gear must be at the home position (UD driving position) and plunger need to be activated, the switch and state change is as figure below:


Motor CCW
Tray 5
Tray 4
Tray 3
Tray 2
Tray 1 (Top Position)
UD Sensor
Top Switch
Tray 5
Tray 4
Tray 3
Tray 2
Tray 1 (Top Position)
Motor CW

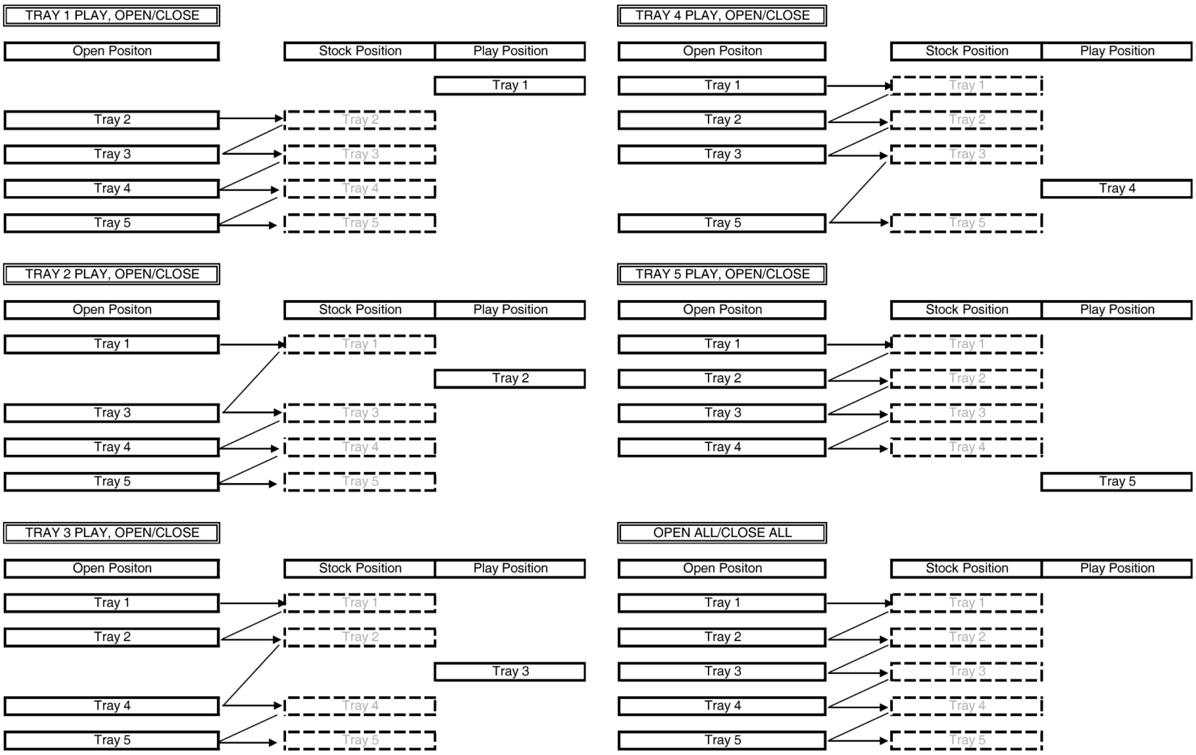
*Condition
i. Cam gear at HOME position
ii. Plunger activated (H)

- To drive the tray(s) between STOCK/PLAY position, cam gear must be at the play driving position and plunger need to be activated, the switch and state change is as figure below:


Motor CCW
PLAY Position
Stock Switch
Play Switch
STOCK Position
Motor CW

*Condition
iii. Cam gear at Play Driving position
iv. Plunger activated (H)

- The mechanism tray opening and closing is cycle process. It is able to open all trays in STOCK position while one of the tray is in PLAY position. The closing can be done one by one or close all at once depend on the user instruction. Below show the tray opening and closing flow.


TRAY 1 PLAY, OPEN/CLOSE
Open Positon
Stock Position
Play Position
Tray 1
Tray 2
Tray 3
Tray 4
Tray 5
TRAY 4 PLAY, OPEN/CLOSE
Open Positon
Stock Position
Play Position
Tray 1
Tray 2
Tray 3
Tray 4
Tray 5
TRAY 2 PLAY, OPEN/CLOSE
Open Positon
Stock Position
Play Position
Tray 1
Tray 2
Tray 3
Tray 4
Tray 5
TRAY 5 PLAY, OPEN/CLOSE
Open Positon
Stock Position
Play Position
Tray 1
Tray 2
Tray 3
Tray 4
Tray 5
TRAY 3 PLAY, OPEN/CLOSE
Open Positon
Stock Position
Play Position
Tray 1
Tray 2
Tray 3
Tray 4
Tray 5
OPEN ALL/CLOSE ALL
Open Positon
Stock Position
Play Position
Tray 1
Tray 2
Tray 3
Tray 4
Tray 5

3.4. Switches Chattering Check

- Each input shall perform chattering check processing.

OPEN-SW	2ms Periodic sampling. It logic-decides by continuation same 5 times.
PLAY-SW	2ms Periodic sampling. It logic-decides by continuation same 5 times.
STOCK-SW	2ms Periodic sampling. It logic-decides by continuation same 5 times.
TOP-SW	2ms Periodic sampling. It logic-decides by continuation same 5 times.
HOME-SW	2ms Periodic sampling. It logic-decides by continuation same 5 times.
UD-SENSOR	2ms Periodic sampling. It logic-decides by continuation same 5 times.
CLOSE-SENSOR	2ms Periodic sampling. It logic-decides by continuation same 5 times.

3.5. Motor Movement Control

Condition	Motor	
	CW	CCW
Free	L	L
Rotate CW	H	L
Rotate CCW	L	H
Short Brake	H	H

3.6. Plunger Timing Chart

- Plunger is use for pulling the lever that a switching gear is sit on the lever. When current supply to the plunger to pulling (kick) switching gear, it will be lift up to engage to 1st gear train. When current supply to plunger is cut off (release), switching gear will be bring done by gravity force and mechanical coil spring on top of it. Plunger use for connect the driving source from motor to 2 different gear train in the mechanism, the functions of the gear trains are as below:
  1. Tray open/close
  2. Drive tray to play/stock position and TRV vertical movement

- The plunger movement is define as below:
  Kick = H, Release= L

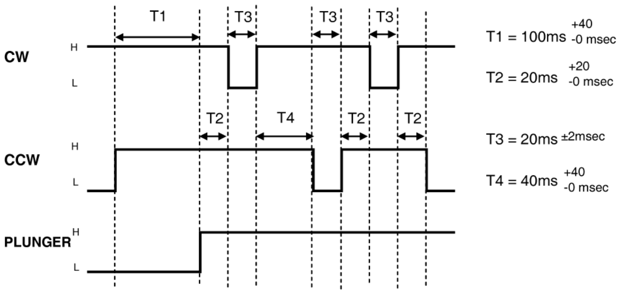
- Each time during plunger activation time (Kick/Release), the motor shall perform a short time CW and CCW rotation for release the gear side force and ensure complete gear to gear engagement.

- The basic concept of the motor rotation sequence (CW or CCW) is base on the initial and final motor rotating direction. The direction should be opposite to the initial and final motor driving direction in order to:
  1. To release the gear teeth side force
  2. To release mechanism belt tension
  3. To ensure switching gear disengage or engage into other gear´s teeth

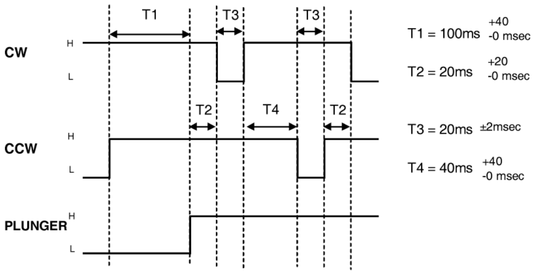
- Summary of the type of motor short rotation direction is as below:

Motor Direction	**Initial**	**Short Rotate Direction**			**Final**	**Switching Mode**
		1st	**2nd**	**3rd**		
Plunger Kick	CW	CCW	CW	CCW	CW	A
		CCW	CW	-	CCW	B
	CCW	CW	CCW	-	CW	C
		CW	CCW	CW	CCW	D
Plunger Release	CW	CCW	CW	CCW	CW	E
		CCW	CW	-	CCW	F
	CCW	CW	CCW	-	CW	G
		CW	CCW	CW	CCW	H

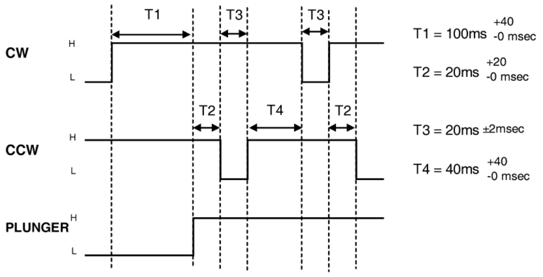
- Below are the timing charts of plunger activation time.


T1
T3
T3
T3
CW
H
L
T2
T4
T2
T2
CCW
H
L
PLUNGER
H
L
T1 = 100ms +40 -0 msec
T2 = 20ms +20 -0 msec
T3 = 20ms ±2msec
T4 = 40ms +40 -0 msec

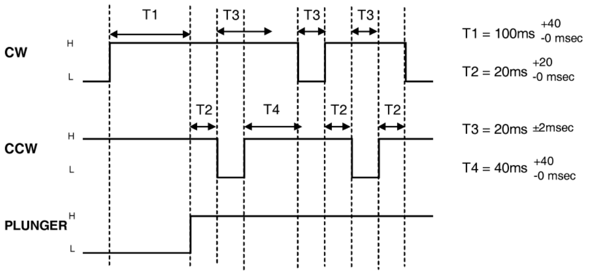
Switching Mode A


T1
T3
T3
CW
H
L
T2
T4
T2
CCW
H
L
PLUNGER
H
L
T1 = 100ms +40 -0 msec
T2 = 20ms +20 -0 msec
T3 = 20ms ±2msec
T4 = 40ms +40 -0 msec

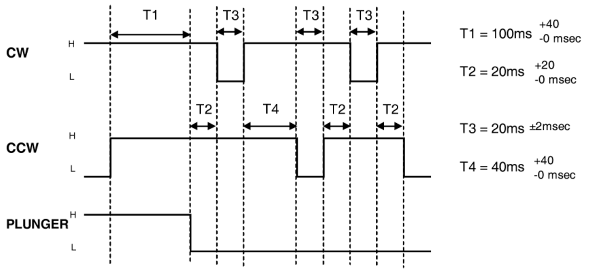
Switching Mode B


T1
T3
T3
CW
H
L
T2
T4
T2
CCW
H
L
PLUNGER
H
L
T1 = 100ms +40 -0 msec
T2 = 20ms +20 -0 msec
T3 = 20ms ±2msec
T4 = 40ms +40 -0 msec

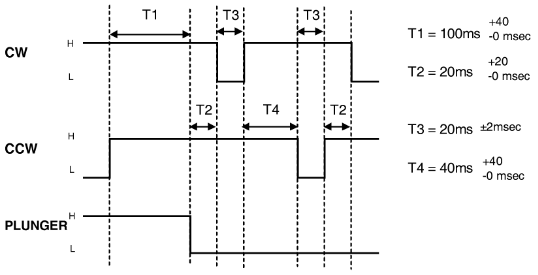
Switching Mode C


T1
T3
T3
T3
CW
H
L
T2
T4
T2
T2
CCW
H
L
PLUNGER
H
L
T1 = 100ms +40 -0 msec
T2 = 20ms +20 -0 msec
T3 = 20ms ±2msec
T4 = 40ms +40 -0 msec

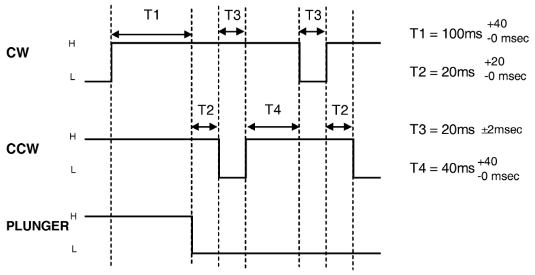
Switching Mode D


T1
T3
T3
T3
CW
H
L
T2
T4
T2
T2
CCW
H
L
PLUNGER
H
L
T1 = 100ms +40 -0 msec
T2 = 20ms +20 -0 msec
T3 = 20ms ±2msec
T4 = 40ms +40 -0 msec

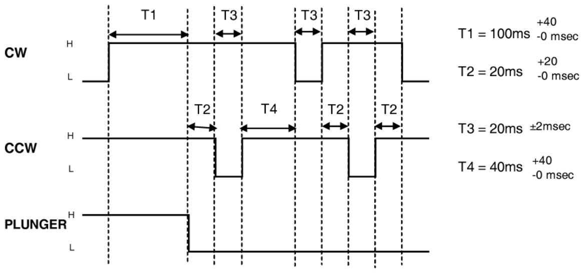
Switching Mode E


T1
T3
T3
CW
H
L
T2
T4
T2
CCW
H
L
PLUNGER
H
L
T1 = 100ms +40 -0 msec
T2 = 20ms +20 -0 msec
T3 = 20ms ±2msec
T4 = 40ms +40 -0 msec

Switching Mode F


T1
T3
T3
CW
H
L
T2
T4
T2
CCW
H
L
PLUNGER
H
L
T1 = 100ms +40 -0 msec
T2 = 20ms +20 -0 msec
T3 = 20ms ±2msec
T4 = 40ms +40 -0 msec

Switching Mode G


T1
T3
T3
T3
CW
H
L
T2
T4
T2
T2
CCW
H
L
PLUNGER
H
L
T1 = 100ms +40 -0 msec
T2 = 20ms +20 -0 msec
T3 = 20ms ±2msec
T4 = 40ms +40 -0 msec

Switching Mode H

· As the plunger only activate at 2 position of cam gear. The plunger mode summary as below:

Switching Position	Initial Motor Direction	Switching Mode	Initial Motor Direction	Function
Home Position	Cam gear rotate CCW to HOME Motor : **CCW**	C	UD base move from bottom to top Motor : **CW**	Tray selection from bottom to top
	Cam gear rotate CCW to HOME Motor : **CCW**	D	UD base move from top to bottom Motor : **CCW**	Tray selection from top to bottom
	UD base move from bottom to top Motor : **CW**	E	Cam gear rotate CW from HOME to Play Driving Position. Motor : **CW**	After tray selection, cam gear rotate to Play Driving Position
	UD base move from top to bottom Motor : **CCW**	G	Cam gear rotate CW from HOME to Play Driving Position. Motor : **CW**	After tray selection, cam gear rotate to Play Driving Position
Play Driving Position	Cam gear rotate CW from HOME to Play Driving Position. Motor : **CW**	A	Drive tray from STOCK position to PLAY position. Motor : **CW**	Load tray to Play
	Cam gear rotate CW from HOME to Play Driving Position. Motor : **CW**	B	Drive tray from PLAY position to STOCK position. Motor : **CCW**	Unload tray from Play to Stock
	Drive tray from STOCK position to PLAY position. Motor : **CW**	F	Cam gear rotate CCW from Play Driving Position to HOME. Motor : **CCW**	After load tray to Play, cam gear return to HOME
	Drive tray from PLAY position to STOCK position. Motor : **CCW**	H	Cam gear rotate CCW from Play Driving Position to HOME. Motor : **CCW**	After unload tray from Play, cam gear return to HOME
	Drive tray from PLAY position to STOCK position. Motor : **CCW**	G	Cam gear rotate CW from until trays full open. Motor : **CW**	Open trays while one tray Play

- Switching mode G is used during initialization to ensure that the switching gear is at the release (down) condition before the initialization process begins.

3.7. Initialization of Mechanism Unit.

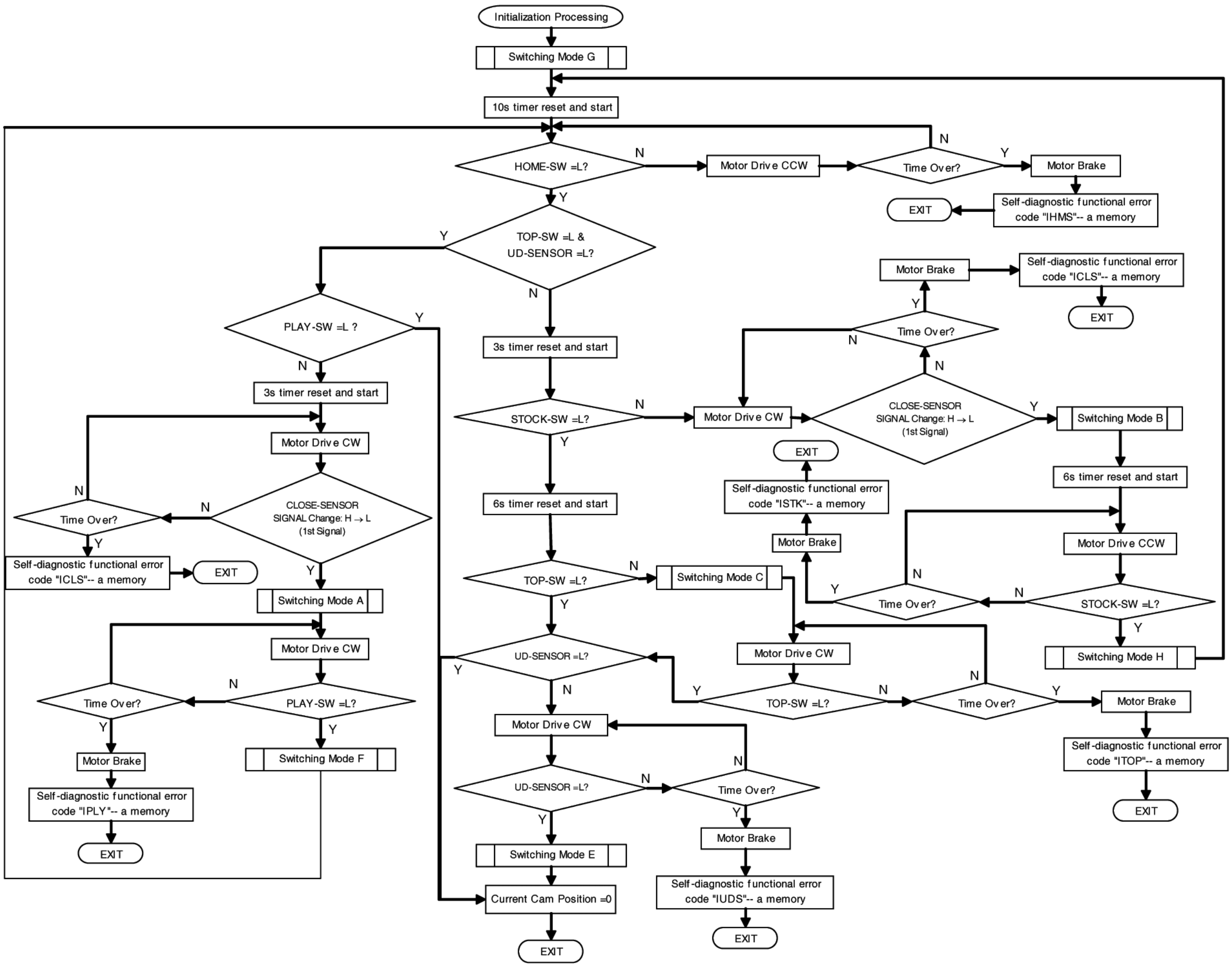
- **Mechanism Initialization** -- This mechanism is designed to operate & set to a pre-defined position to prevent malfunction when unavoidable circumstances happen. For examples: user mis-handling during transportaion or abnormal user operations.This is comply to the product shipping reliability standards.

- Mechanism is initialized when the mechanism controller is unable to detect the present condition/state of mechanism. For example, when the microcomputer carries out a cold start. (In complete unit)

- Once the initialization process is completed, the mechanism unit is set to this condition:-
  1. Tray 1 is at PLAY position (Top tray)
  2. The traverse unit is at clamping condition (PLAY SW-L)
  3. All the remaining trays are in STOCK Position (Trays 2 ~ 5)
  4. Plunger lever at release condition
  5. Cam gear is at Home position (HOME SW-L)
  6. Motor is free (CW-L, CCW-L)

  Note: This is same as shipment condition. (In complete unit)

- Below is the flow chart of the initialization process:-


Initialization Processing
Switching Mode G
10s timer reset and start
HOME-SW =L?
N
Y
Motor Drive CCW
Time Over?
N
Y
Motor Brake
Self-diagnostic functional error code "IHMS"-- a memory
EXIT
TOP-SW =L & UD-SENSOR =L?
Y
N
Motor Brake
Self-diagnostic functional error code "ICLS"-- a memory
EXIT
Time Over?
Y
N
PLAY-SW =L ?
Y
N
3s timer reset and start
3s timer reset and start
Motor Drive CW
CLOSE-SENSOR SIGNAL Change: H → L (1st Signal)
STOCK-SW =L?
N
Y
Motor Drive CW
CLOSE-SENSOR SIGNAL Change: H → L (1st Signal)
Y
Switching Mode B
EXIT
Self-diagnostic functional error code "ISTK"-- a memory
6s timer reset and start
Time Over?
N
Y
Self-diagnostic functional error code "ICLS"-- a memory
EXIT
6s timer reset and start
Motor Brake
Motor Drive CCW
Switching Mode A
TOP-SW =L?
N
Y
Switching Mode C
Time Over?
N
Y
STOCK-SW =L?
N
Y
Motor Drive CW
UD-SENSOR =L?
Y
N
Motor Drive CW
Switching Mode H
Time Over?
PLAY-SW =L?
N
Y
TOP-SW =L?
N
Y
Time Over?
N
Y
Motor Brake
Motor Drive CW
Motor Brake
Switching Mode F
Self-diagnostic functional error code "ITOP"-- a memory
Self-diagnostic functional error code "IPLY"-- a memory
UD-SENSOR =L?
N
Y
Time Over?
N
Y
EXIT
EXIT
Motor Brake
Switching Mode E
Current Cam Position =0
Self-diagnostic functional error code "IUDS"-- a memory
EXIT
EXIT

The completion of Initialization process

Note:
After Initialization process, mechanism should load tray 1 to PLAY position.

3.8. Mechanism "HOME" position

- Mechanism HOME position is a starting position for few functions, such as below:
  1. Load tray from STOCK position to PLAY position
  2. Unload tray from PLAY position to STOCK position
  3. Open trays
  4. Driving UD base up/down

- Besides this, it will always return to “HOME” position after performing below functions:
  1. After tray completely clamped by Traverse unit
  2. Closing All trays
  3. Closing tray 5
  4. After completely the UD base movement

- There are 2 type of mode to go to HOME position.

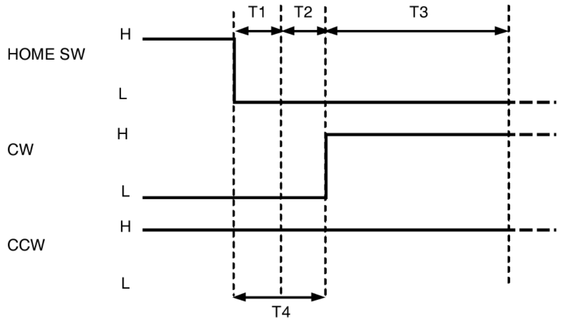
Mode 1 is to go to HOME position and motor brake and stay at HOME position, motor need longer brake time for reduce overrun of mechanical parts.

For Mode 2, after mechanism go to HOME position, motor immediately rotate reverse direction to go do loading/unloading processing, shorter brake time necessary to reduce the total mechanism operation time.

The table below is types of "GO HOME" mode and operation that use it.

GO HOME MODE 1	GO HOME MODE 2
1. After loading tray to PLAY position	1. After closing all trays (no tray at PLAY position)
2. After unloading tray to STOCK position	
3. After closing all trays (one tray at PLAY position)	

- The timing chart for the mechanism to set to “HOME” position is illustrated as below.



T1: Chattering Check = $10\ ms^{+2ms}_{-0}$

T2: Motor Wait Time = $10\ ms^{+2ms}_{-0}$

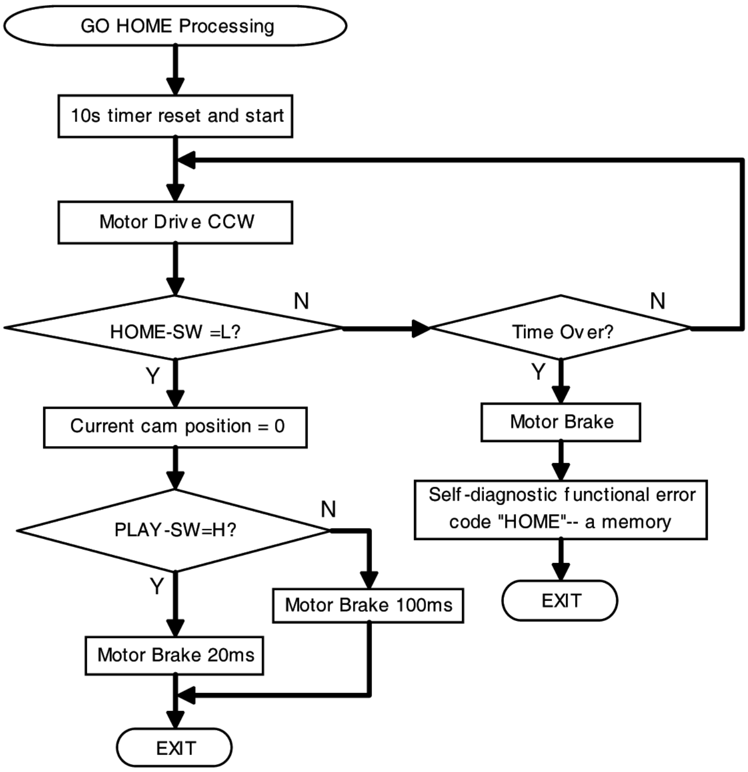
T3: Short Brake = $100\ ms \pm 10ms$ (PLAY-SW=L)

T3: Short Brake = $20\ ms \pm 10ms$ (PLAY-SW=H)

T4: T1+T2 = $20\ ms^{+4ms}_{-0}$

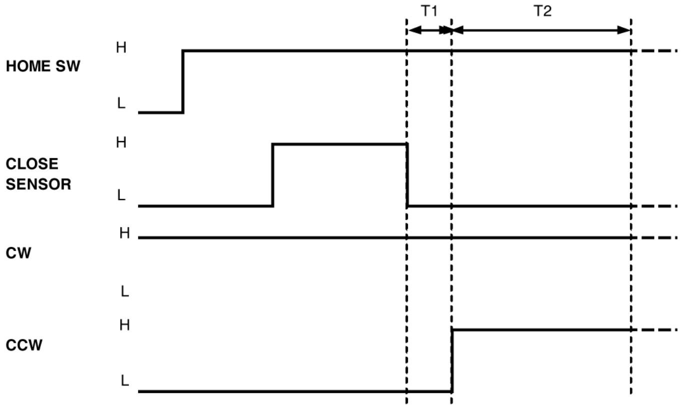
Note: T2 is time for motor free run for ensure HOME switch at stable ON condition.

- Below is the flow chart for the mechanism to set to “HOME” position.


GO HOME Processing
10s timer reset and start
Motor Drive CCW
HOME-SW =L?
N
Y
Time Over?
N
Y
Current cam position = 0
Motor Brake
Self-diagnostic functional error code "HOME"-- a memory
EXIT
PLAY-SW=H?
N
Y
Motor Brake 100ms
Motor Brake 20ms
EXIT

3.9. Mechanism "Play Driving" position

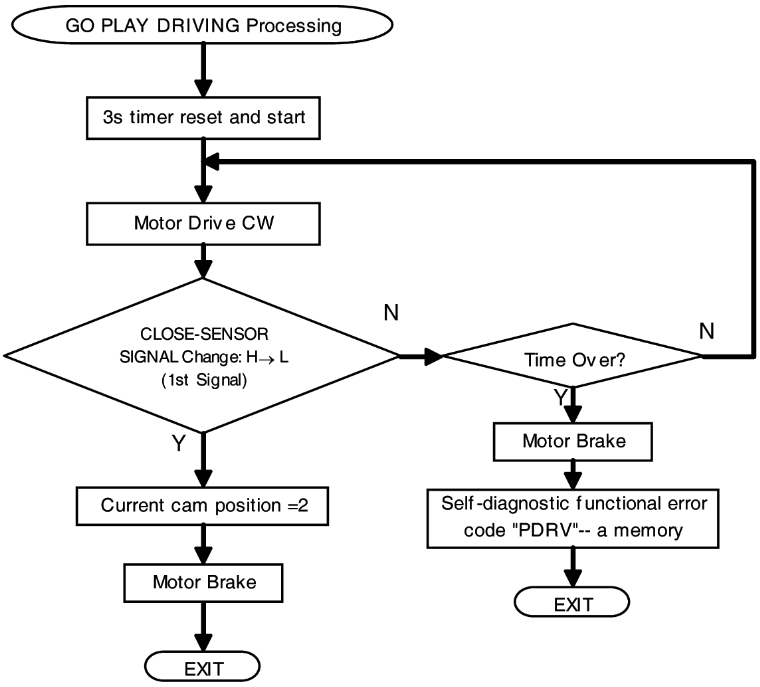
- Play driving position is a position driving source linkage to drive the tray(s) between STOCK position and PLAY position (load and unload of tray). Cam gear will rotate to this position from HOME position, and after the completion of clamping process will back to HOME position.
  For Go to Play Driving position, cam gear move from HOME position, motor brake after detect 1st time CLOSE sensor signal change from H→L


T1
T2
HOME SW
H
L
CLOSE SENSOR
H
L
CW
H
L
CCW
H
L

T1: Chattering Check = $10\ ms^{+2ms}_{-0}$

T2: Short Brake = $100\ ms \pm 10ms$

- Below is the flow chart for the mechanism to set PLAY DRIVING position.


GO PLAY DRIVING Processing
3s timer reset and start
Motor Drive CW
CLOSE-SENSOR SIGNAL Change: H→ L (1st Signal)
N
Time Over?
N
Y
Motor Brake
Self-diagnostic functional error code "PDRV"-- a memory
EXIT
Y
Current cam position =2
Motor Brake
EXIT

3.10. Trays Operation

3.10.1. Tray ‘Open’ Operation

- Changer mechanisms are required to open trays to load a disc. This mechanism features an "All Open" or "Change all one by one" function for quick & easy disc change. There are 3 kinds of "Tray Open" conditions.
  1. **All trays open**

     Occurs when OPEN/CLOSE button is pressed, playing tray will be driven to STOCK position and all trays will driven to OPEN position. All trays will remain open until "DISC CHANGE" or "OPEN/CLOSE" is pressed. When "DISC CHANGE" is pressed, the upper most tray will close while "OPEN/CLOSE" is close all trays.
  2. **Open selected tray while one tray at PLAY position**

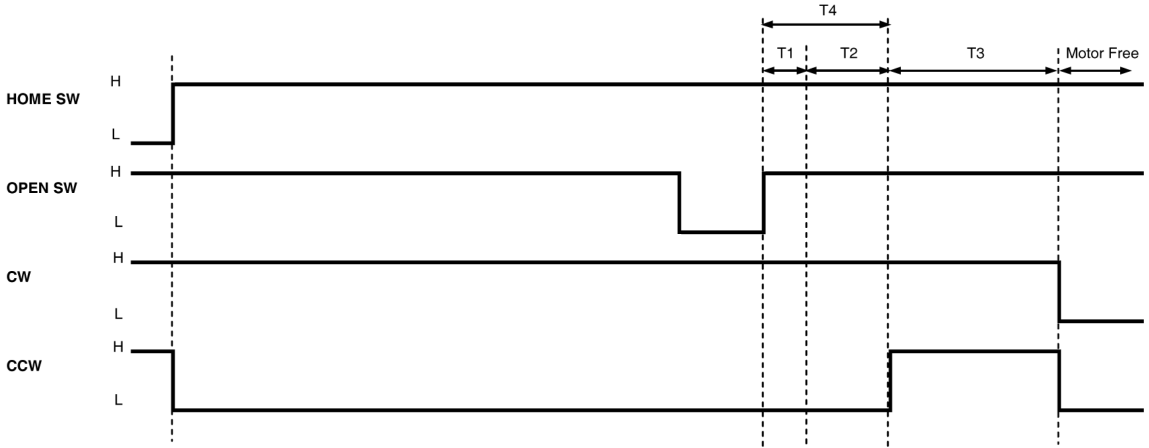
     Occurs when specify tray is selected to be opened while one tray is at PLAY position. This operation never disturbs the playing disc operation and allow user to change desire disc on specific tray.
  3. **Direct open playing tray**

     Occurs only when the user selects to open playing tray. Tray at PLAY position will stop recording/reproducing process and being driven to STOCK position. This will follow by driven all trays to OPEN position and trays closing until the previous playing tray expose for disc changing.Example: User press "DISC CHANGE" + "DISC 3". Mechanism opens all the trays, then closes trays 1 & 2 respectively exposing the tray 3.

- The timing chart for both positions is the same, motor rotate CW direction, until OPEN SW changing signal H→ L → H, motor need to continue run for 45ms.

- Motor free at the end of tray open, this is for enable the tray to be manually pushing by user.

- Below is the timing chart for tray opening.



T1: Chattering Check = $10\ ms^{+2ms}_{-0}$
T2: Motor Wait Time = $45\ ms^{+2ms}_{-0}$
T3: Short Brake = $100\ ms \pm 10ms$
T4: T1+T2 = $55\ ms^{+4ms}_{-0}$
Note: T2 is time for motor free run for ensure protrude trays to full stroke condition.

- For all type of trays opening, either 4 trays (open remaining) or 5 trays (all open) will be set to OPEN position.

3.10.2. Tray Closing Operation

- The following action is tray closing. For this mechanism, there are 3 types of trays closing also.

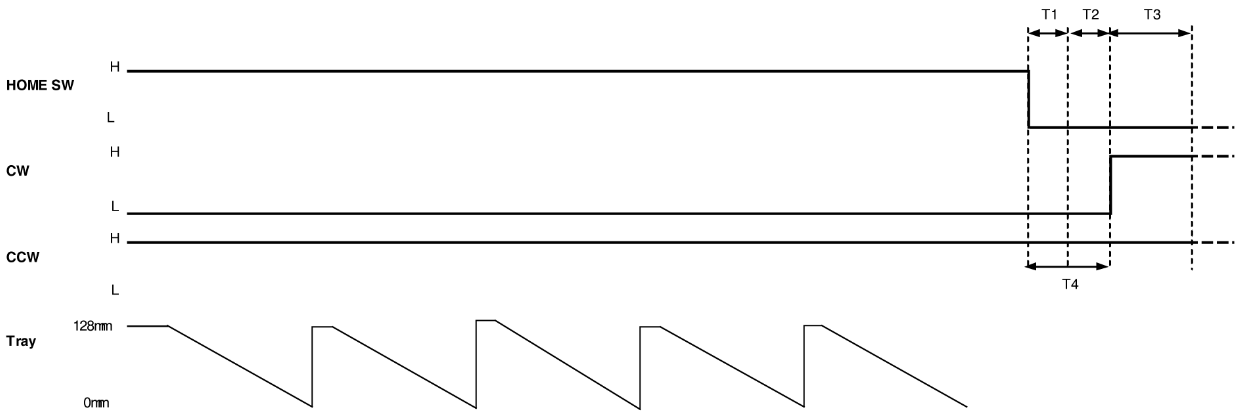
1. **All trays close**
   When user press "OPEN/CLOSE" after trays open, all trays (at any condition) will being driven to STOCK position.
2. **Auto Tray Close**
   This closing operation is an internal operation in the mechanism. This operation completes the open selected tray function. Mechanism uses this operation to drive trays that cover top surface of desire tray to STOCK position and then expose the selected tray for user to do disc exchanging.
3. **Change**
   When user press "CHANGE", one tray will be driven to STOCK position. This operation is for changing disc one by one from top to bottom. The operation each time will only drive the upper most tray to STOCK position, it can be only being interrupt by "OPEN/CLOSE". If the "CHANGE" being pressed during one tray is closing, mechanism will close the second tray immediately after 1st tray. The number of tray will be closed equal to number time of "CHANGE button" being pressed.

- All trays close can occurs anytime when there is tray at open condition. The all trays close processing is used when mechanism carry out the function as:

1. Close Tray 5
2. Close Tray 4 while tray 5 is in PLAY position
3. User press OPEN/CLOSE to instruct all trays close.

- Mechanism will close all the trays by rotating cam gear at CCW direction until detect HOME position

- Below is the timing chart for tray close (until detect HOME position).



T1: Chattering Check = $10\ ms^{+2ms}_{-0}$

T2: Motor Wait Time = $10\ ms^{+2ms}_{-0}$

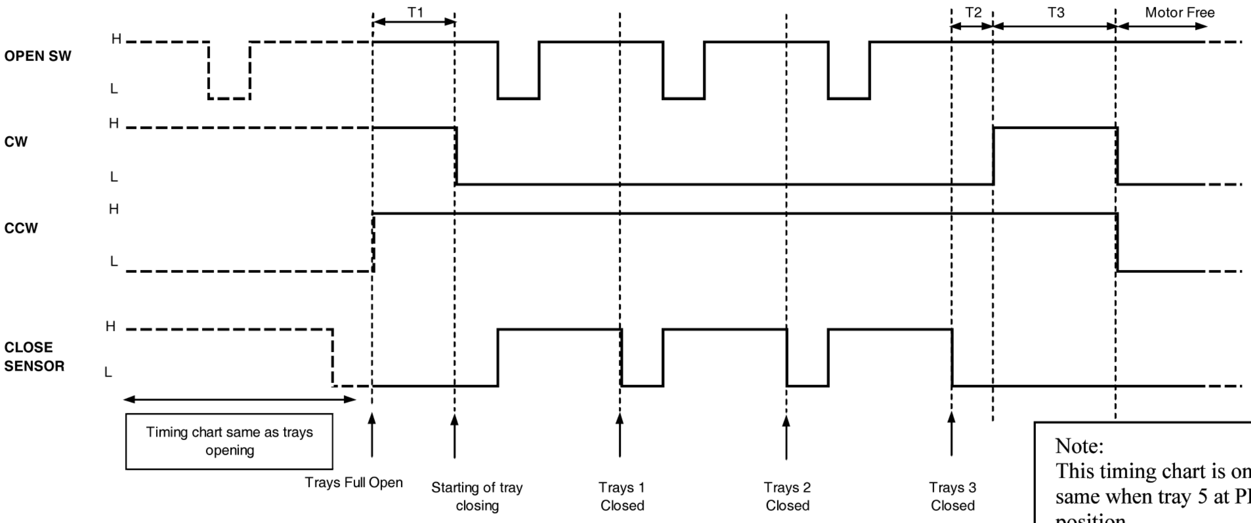
T3: Short Brake = $100\ ms \pm 10ms$

T4: T1+T2 = $20\ ms^{+4ms}_{-0}$

- Table below explain the function of open selected tray while one tray at PLAY position. This table indicated the possible tray at playing trays. For opened tray, all trays will be open except the tray at PLAY position. Trays will close to expose the selected tray for user to input or change the disc.

	OPEN POSITION	STOCK POSITION	PLAY POSITION	
Function	Tray Opened	Tray Closed	Possible Playing Tray	Micro-P Command
Open Tray 1	Tray 1 Tray 2 Tray 3 Tray 4 Tray 5			Tray Open → End
Open Tray 2	Tray 2 Tray 3 Tray 4 Tray 5	Tray 1		Tray Open → Auto Close Tray 1
Open Tray 3	Tray 3 Tray 4 Tray 5	Tray 1 Tray 2		Tray Open → Auto Close Tray 1→ Auto Close Tray 2
Open Tray 4	Tray 4 Tray 5	Tray 1 Tray 2 Tray 3		Tray Open → Auto Close Tray 1→ Auto Close Tray 2 → Auto Close Tray 3
Open Tray 5	Tray 5	Tray 1 Tray 2 Tray 3 Tray 4		Tray Open → Auto Close Tray 1→ Auto Close Tray 2 → Auto Close Tray 3 → Auto Close Tray 4

- Timing chart below, shown an example of user select to open tray 4 only.


T1
T2
T3
Motor Free
OPEN SW
CW
CCW
CLOSE SENSOR
H
L
Timing chart same as trays opening
Trays Full Open
Starting of tray closing
Trays 1 Closed
Trays 2 Closed
Trays 3 Closed

Note:
This timing chart is only same when tray 5 at PLAY position.

T1: Short Brake = $20\ ms \pm 10ms$

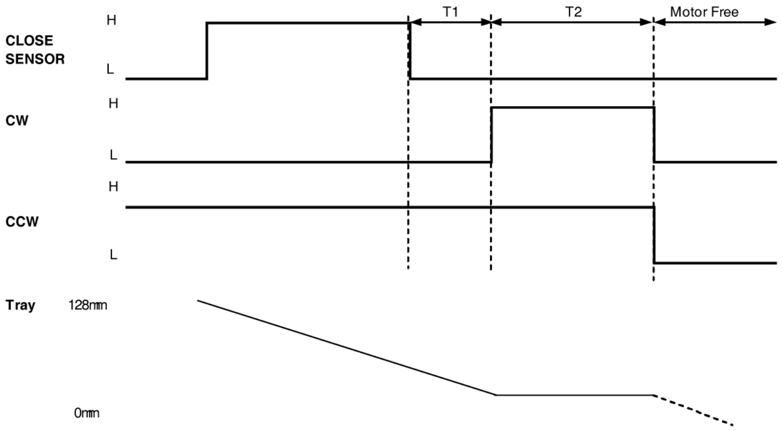
T2: Chattering Check = $10\ ms^{+2ms}_{-0}$

T3: Short Brake = $100\ ms \pm 10ms$

- The "Change" operation is to close one tray each time when "CHANGE" is pressed. This is the basic operation of "auto tray close". The "change" operation will stop after detect a signal change in CLOSE-SENSOR while "auto tray close" count the number of CLOSE-SENSOR signal change and stop at before selected tray start to move to STOCK position.

  If there is a case where user select a upper level tray of current tray in PLAY position to be closed, (e.g. current tray at PLAY position is tray 4, user select tray 3 to be open), micro-p counting of CLOSE sensor signal must done until tray 4 position, before motor brake. The reason is to eliminate long waiting time for the next tray closing.

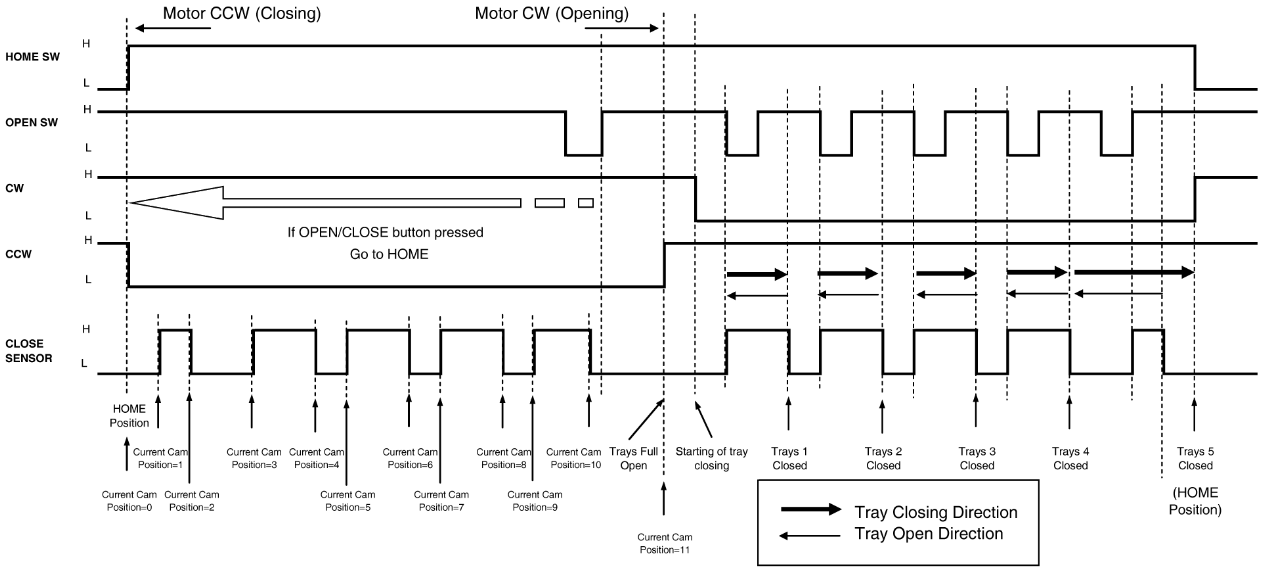
- Below is the timing chart of tray closing (Change Operation):-


T1
T2
Motor Free
CLOSE SENSOR
CW
CCW
H
L
Tray
128mm
0mm

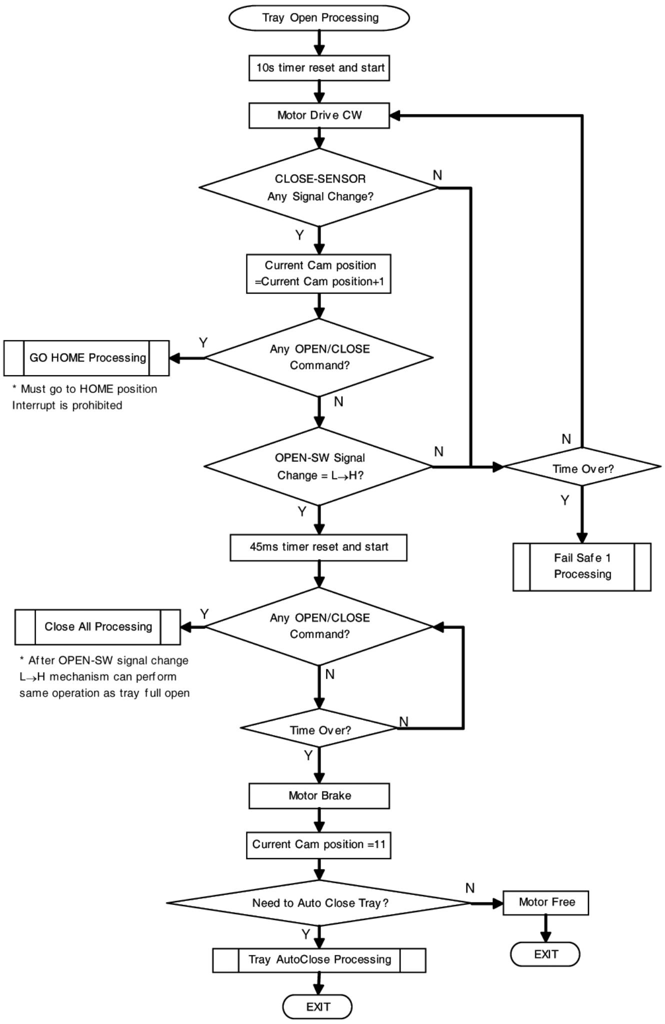
T1: Chattering Check = $10\ ms^{+2ms}_{-0}$

T2: Short Brake = $100\ ms \pm 10ms$

- Tray opening and closing is control by cam gear and CLOSE-SENSOR signal. OPEN-SW is only use for full open operation in order to get more accurate tray stroke. Figure below show the cam gear rotation direction for tray opening and closing, and cam important position.


Motor CCW (Closing)
Motor CW (Opening)
HOME SW
OPEN SW
CW
CCW
CLOSE SENSOR
H
L
If OPEN/CLOSE button pressed
Go to HOME
HOME Position
Current Cam Position=0
Current Cam Position=1
Current Cam Position=2
Current Cam Position=3
Current Cam Position=4
Current Cam Position=5
Current Cam Position=6
Current Cam Position=7
Current Cam Position=8
Current Cam Position=9
Current Cam Position=10
Trays Full Open
Current Cam Position=11
Starting of tray closing
Trays 1 Closed
Trays 2 Closed
Trays 3 Closed
Trays 4 Closed
Trays 5 Closed
(HOME Position)
Tray Closing Direction
Tray Open Direction

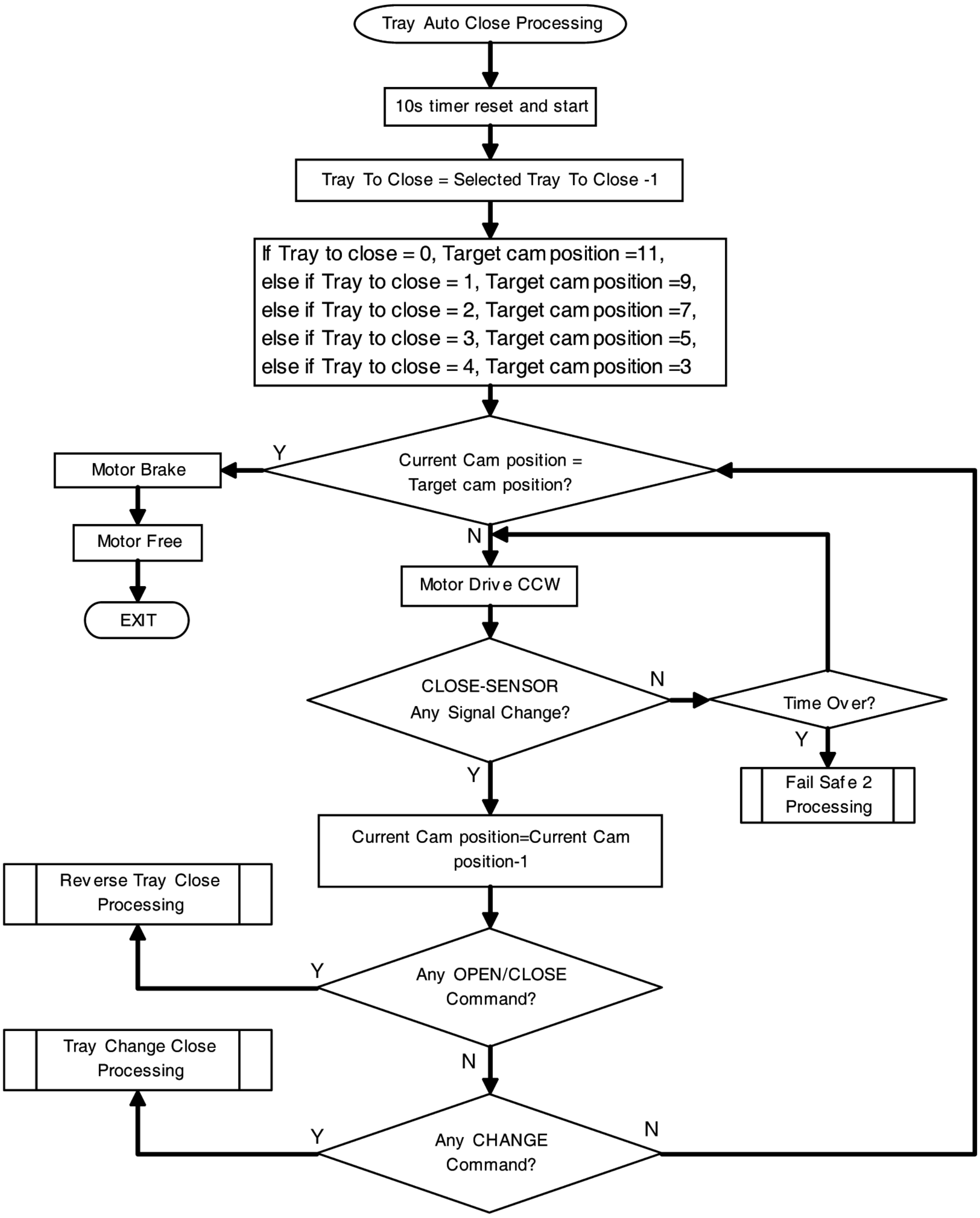
· Below is the flow chart for tray open processing.

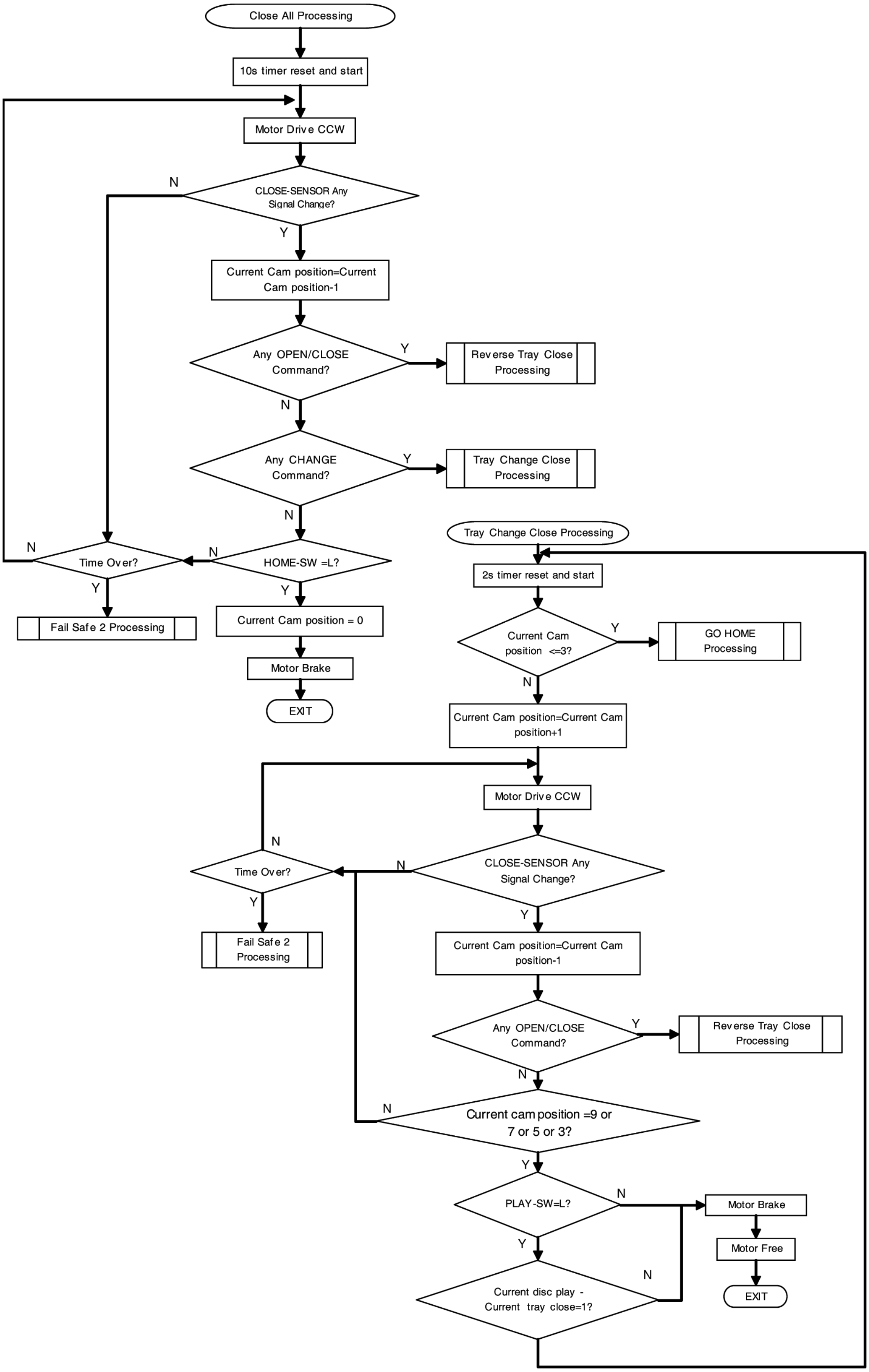

Tray Open Processing
10s timer reset and start
Motor Drive CW
CLOSE-SENSOR Any Signal Change?
N
Y
Current Cam position =Current Cam position+1
Any OPEN/CLOSE Command?
Y
GO HOME Processing
* Must go to HOME position Interrupt is prohibited
N
OPEN-SW Signal Change = L→H?
N
Time Over?
N
Y
Fail Safe 1 Processing
Y
45ms timer reset and start
Any OPEN/CLOSE Command?
Y
Close All Processing
* After OPEN-SW signal change L→H mechanism can perform same operation as tray full open
N
Time Over?
N
Y
Motor Brake
Current Cam position =11
Need to Auto Close Tray?
N
Motor Free
EXIT
Y
Tray AutoClose Processing
EXIT

· The flow charts below shown the types of tray close processing, for tray auto close processing is use if user select a specify tray to be close automatically after trays full open.

· Tray change close processing use if use select a function and want to change disc one by one from top tray to bottom tray.

- Close all processing is use when user wants to close all trays at once, or want to close tray no.5 or close tray no.4 while tray no. 5 is at PLAY position.

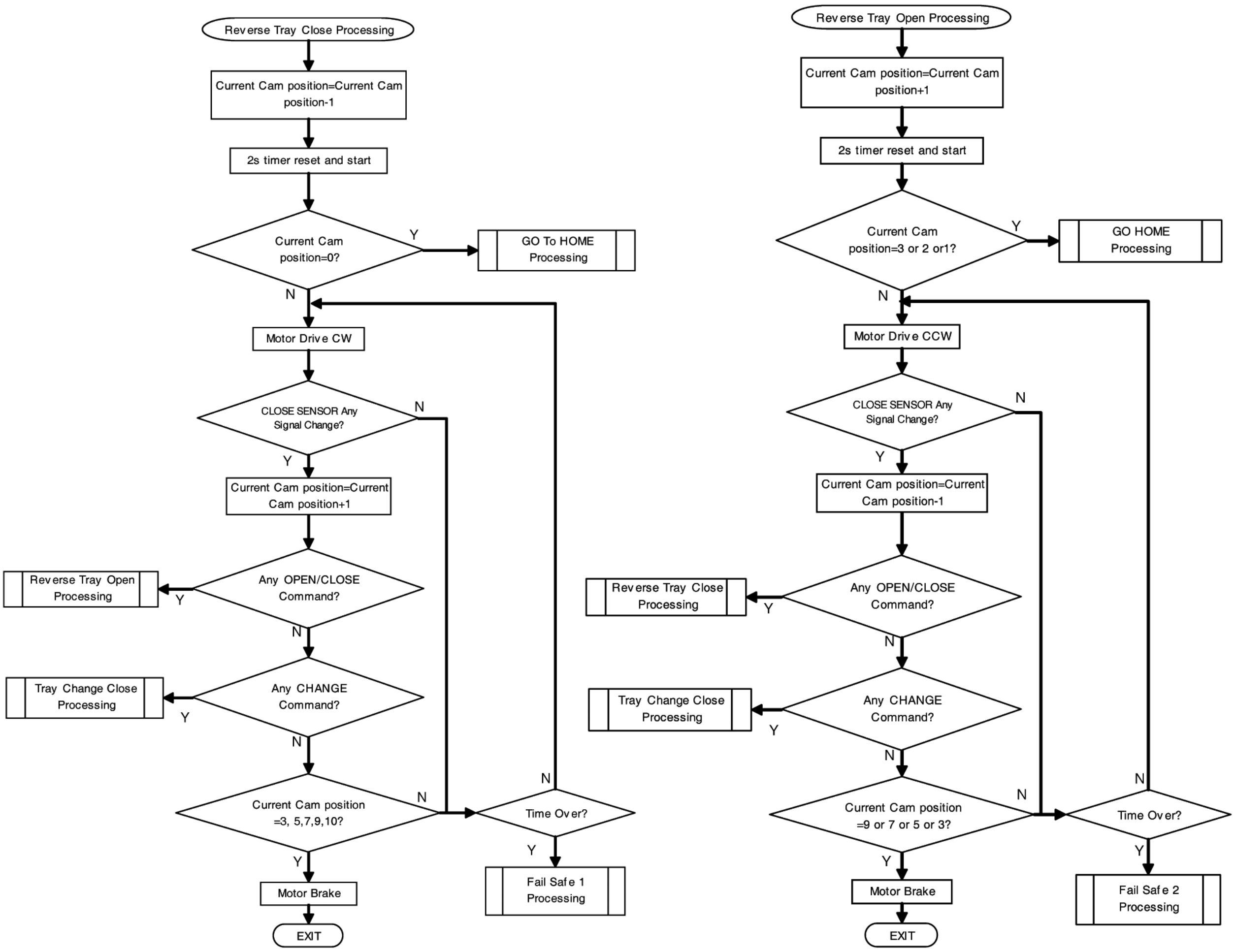

Tray Auto Close Processing
10s timer reset and start
Tray To Close = Selected Tray To Close -1
If Tray to close = 0, Target cam position =11,
else if Tray to close = 1, Target cam position =9,
else if Tray to close = 2, Target cam position =7,
else if Tray to close = 3, Target cam position =5,
else if Tray to close = 4, Target cam position =3
Current Cam position = Target cam position?
Y
Motor Brake
Motor Free
EXIT
N
Motor Drive CCW
CLOSE-SENSOR Any Signal Change?
N
Time Over?
Y
Fail Safe 2 Processing
Y
Current Cam position=Current Cam position-1
Reverse Tray Close Processing
Y
Any OPEN/CLOSE Command?
N
Tray Change Close Processing
Y
Any CHANGE Command?
N


Close All Processing
10s timer reset and start
Motor Drive CCW
CLOSE-SENSOR Any Signal Change?
N
Y
Current Cam position=Current Cam position-1
Any OPEN/CLOSE Command?
Y
Reverse Tray Close Processing
N
Any CHANGE Command?
Y
Tray Change Close Processing
N
HOME-SW =L?
N
Time Over?
N
Y
Fail Safe 2 Processing
Y
Current Cam position = 0
Motor Brake
EXIT
Tray Change Close Processing
2s timer reset and start
Current Cam position <=3?
Y
GO HOME Processing
N
Current Cam position=Current Cam position+1
Motor Drive CCW
CLOSE-SENSOR Any Signal Change?
N
Time Over?
N
Y
Fail Safe 2 Processing
Y
Current Cam position=Current Cam position-1
Any OPEN/CLOSE Command?
Y
Reverse Tray Close Processing
N
Current cam position =9 or 7 or 5 or 3?
N
Y
PLAY-SW=L?
N
Motor Brake
Motor Free
EXIT
Y
Current disc play - Current tray close=1?
N

- When there is a OPEN/CLOSE button pressed during tray open or tray close operation. Motor will rotate revere direction. There are 2 type of cases, where 1st is before full open condition (open/close gear assembly still resting) and the 2nd is after trays full open condition. For the 1st condition, motor will rotate the cam gear to move between HOME direction and tray open

While for the 2nd case, cam gear inside mechanism will move between specific positions by checking CLOSE-SENSOR signal change.

- The flow chart for both open reverse (when tray opening motor reverse) and close reverse (when tray closing motor reverse) is as below. The operation use when user press OPEN/CLOSE button during tray is opening or closing.


Reverse Tray Close Processing
Current Cam position=Current Cam position-1
2s timer reset and start
Current Cam position=0?
Y
GO To HOME Processing
N
Motor Drive CW
CLOSE SENSOR Any Signal Change?
N
Y
Current Cam position=Current Cam position+1
Reverse Tray Open Processing
Y
Any OPEN/CLOSE Command?
N
Tray Change Close Processing
Y
Any CHANGE Command?
N
Current Cam position =3, 5,7,9,10?
N
Time Over?
N
Y
Fail Safe 1 Processing
Y
Motor Brake
EXIT
Reverse Tray Open Processing
Current Cam position=Current Cam position+1
2s timer reset and start
Current Cam position=3 or 2 or1?
Y
GO HOME Processing
N
Motor Drive CCW
CLOSE SENSOR Any Signal Change?
N
Y
Current Cam position=Current Cam position-1
Reverse Tray Close Processing
Y
Any OPEN/CLOSE Command?
N
Tray Change Close Processing
Y
Any CHANGE Command?
N
Current Cam position =9 or 7 or 5 or 3?
N
Time Over?
N
Y
Fail Safe 2 Processing
Y
Motor Brake
EXIT

3.11. Drive tray between STOCK and PLAY position

- Play position is defined as the position whereas the tray is aligned to be played over the CD/ DVD unit. Only a single tray can be at this location & note that the traverse mechanism is at its clamped position. Play position can be either disc playing (actively reading disc data) or its not playing (no data reading).

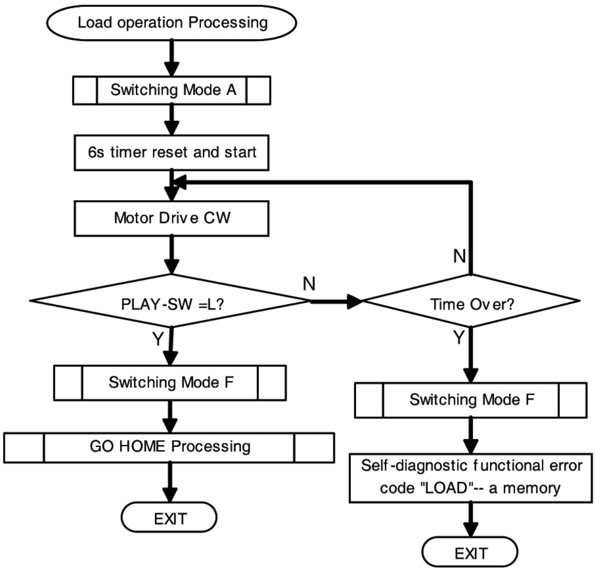
  * **Shipment** or **Initialize** positions always finish with a tray at this location.

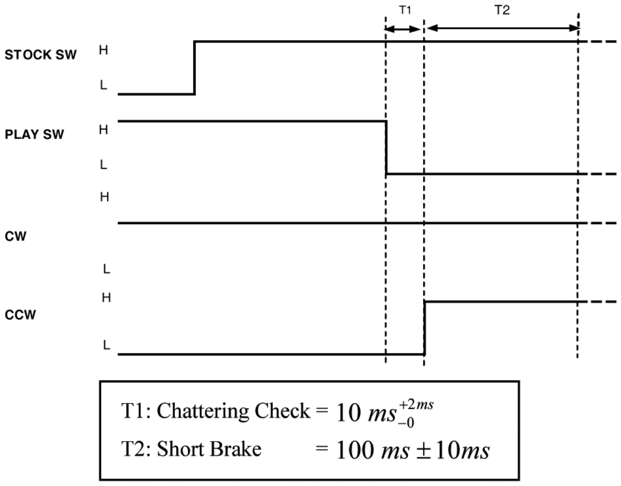
- Loading operation is process to move tray from STOCK position to PLAY position.

- Unloading operation is process to move tray from PLAY position to STOCK position.

- If there is a certain operation key pressed at the middle of movement. The reversal operation is necessary. The reversal operation should carry out after the tray arriving the STOCK position or PLAY position.

- The flow chart and timing chart for load a disc from STOCK position to PLAY position is as below:

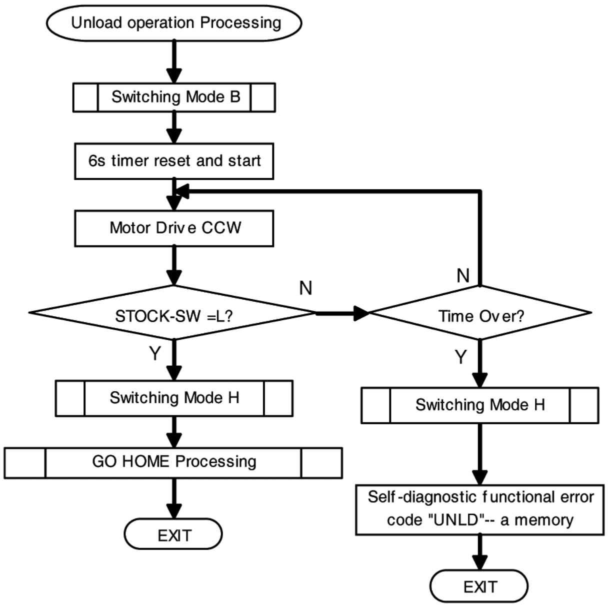

Load operation Processing
Switching Mode A
6s timer reset and start
Motor Drive CW
PLAY-SW =L?
N
Y
Time Over?
N
Y
Switching Mode F
GO HOME Processing
EXIT
Switching Mode F
Self-diagnostic functional error code "LOAD"-- a memory
EXIT

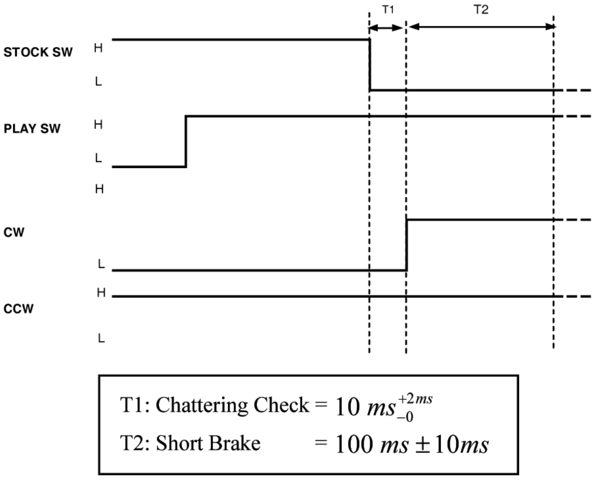

T1
T2
STOCK SW
H
L
PLAY SW
H
L
H
CW
L
H
CCW
L

T1: Chattering Check = $10\ ms^{+2ms}_{-0}$

T2: Short Brake = $100\ ms \pm 10ms$

- The flow chart and timing chart for unload a disc from PLAY position to STOCK position is as below:


Unload operation Processing
Switching Mode B
6s timer reset and start
Motor Drive CCW
STOCK-SW =L?
N
Y
Time Over?
N
Y
Switching Mode H
GO HOME Processing
EXIT
Switching Mode H
Self-diagnostic functional error code "UNLD"-- a memory
EXIT


T1
T2
STOCK SW
H
L
PLAY SW
H
L
H
CW
L
H
CCW
L

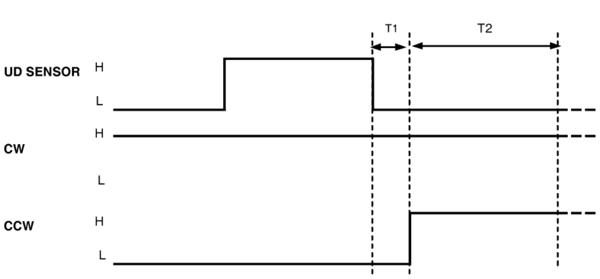
T1: Chattering Check = $10\ ms^{+2ms}_{-0}$

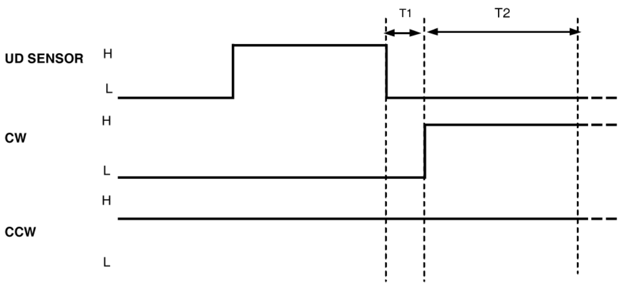
T2: Short Brake = $100\ ms \pm 10ms$

3.12. Selection of Tray by Moving UD base Up/down

- Tray alignment & selection is achieved by UD (up/down) movement, whereas the Mechanism vertically aligns itself to the selected tray to be driven to PLAY position or STOCK position. The upper most tray is defined as tray 1 and bottom most tray is defined as tray 5. Counting is achieved by resetting during initialization to the TOP-SW (tray 1) and counting the signal change by UD-SENSOR.

- Below are the timing chart for UD base tray selection Up/down:


T1
T2
UD SENSOR
H
L
CW
H
L
CCW
H
L

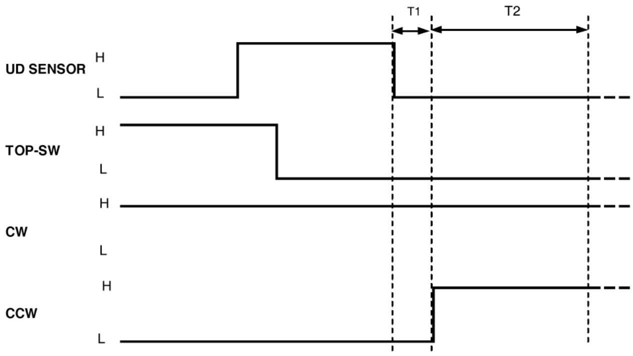

T1
T2
UD SENSOR
H
L
CW
H
L
CCW
H
L

UD base move up 5 → 2

UD base move up 1 → 5

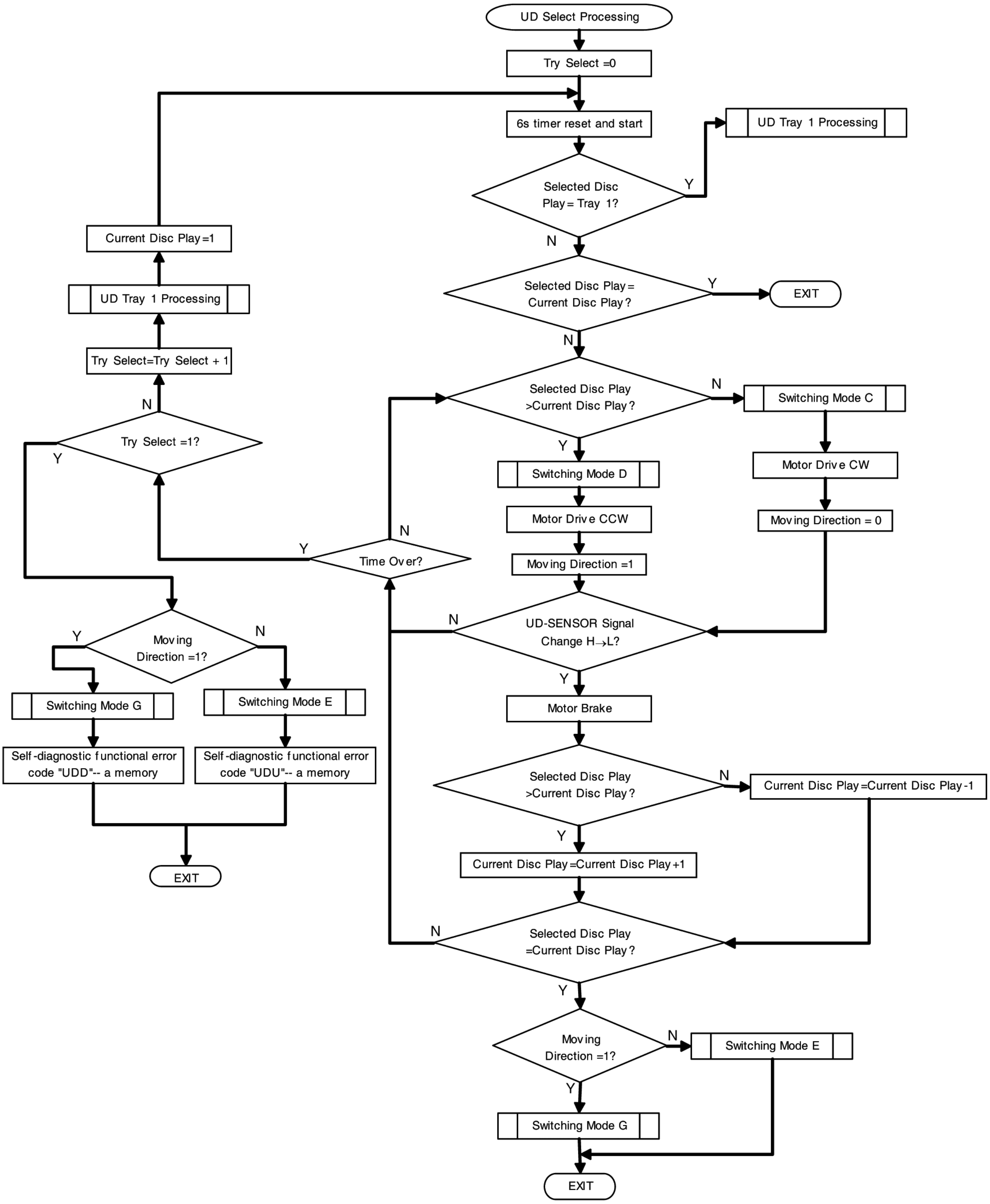
T1: Chattering Check = $10\ ms^{+2ms}_{-0}$
T2: Short Brake = $100\ ms \pm 10ms$

- Tray 1 is the reset position for UD base up/down processing. The position should be unique; a TOP-SW is use in this purpose.

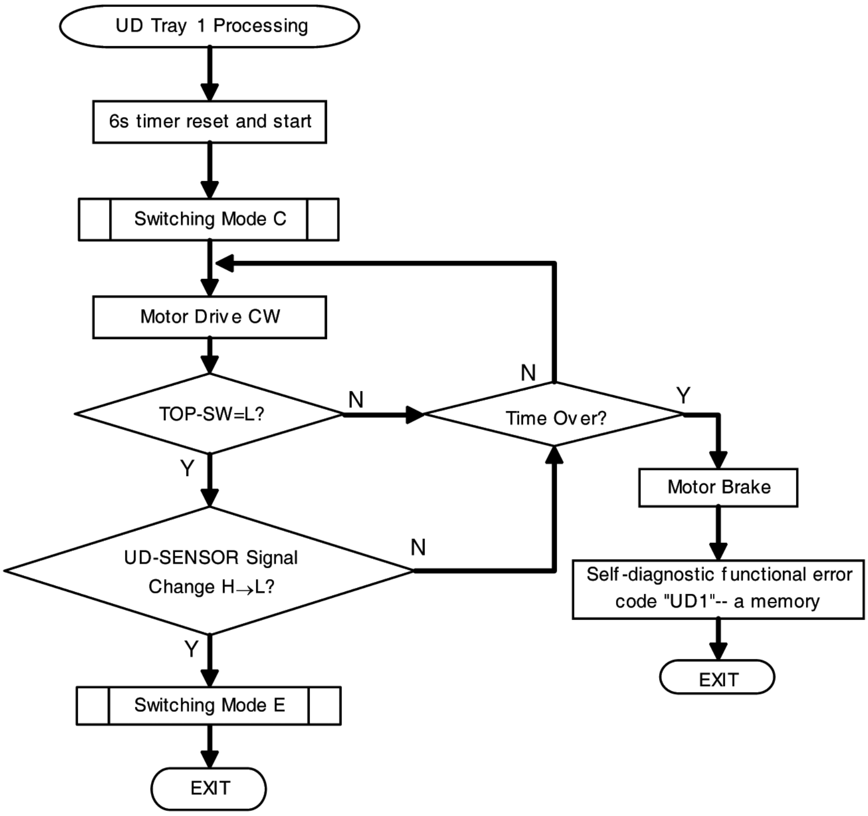

T1
T2
UD SENSOR
H
L
TOP-SW
H
L
CW
H
L
CCW
H
L

T1: Chattering Check = $10\ ms^{+2ms}_{-0}$
T2: Short Brake = $100\ ms \pm 10ms$

- Below is the flow chart for UD selection processing.


UD Select Processing
Try Select =0
6s timer reset and start
UD Tray 1 Processing
Selected Disc Play = Tray 1?
Y
N
Selected Disc Play = Current Disc Play?
Y
EXIT
N
Current Disc Play=1
UD Tray 1 Processing
Try Select=Try Select + 1
N
Try Select =1?
Y
Selected Disc Play >Current Disc Play?
N
Switching Mode C
Y
Switching Mode D
Motor Drive CW
Motor Drive CCW
Moving Direction = 0
Moving Direction =1
N
Y
Time Over?
Moving Direction =1?
Y
N
UD-SENSOR Signal Change H→L?
N
Y
Switching Mode G
Switching Mode E
Motor Brake
Self-diagnostic functional error code "UDD"-- a memory
Self-diagnostic functional error code "UDU"-- a memory
Selected Disc Play >Current Disc Play?
N
Current Disc Play=Current Disc Play-1
Y
EXIT
Current Disc Play=Current Disc Play+1
N
Selected Disc Play =Current Disc Play?
Y
Moving Direction =1?
N
Switching Mode E
Y
Switching Mode G
EXIT

- For tray 1 selection, flow chart below will be used.


UD Tray 1 Processing
6s timer reset and start
Switching Mode C
Motor Drive CW
TOP-SW=L?
N
Y
Time Over?
N
Y
Motor Brake
UD-SENSOR Signal Change H→L?
N
Y
Self-diagnostic functional error code "UD1"-- a memory
EXIT
Switching Mode E
EXIT

3.13. Fail Safe

- Fail safe function is for purpose of recovery of tray movement if the mechanism is not able to carry out tray open or close within a specified time.

Fail safe 1: Tray can not open: Fail safe - move all trays to home position

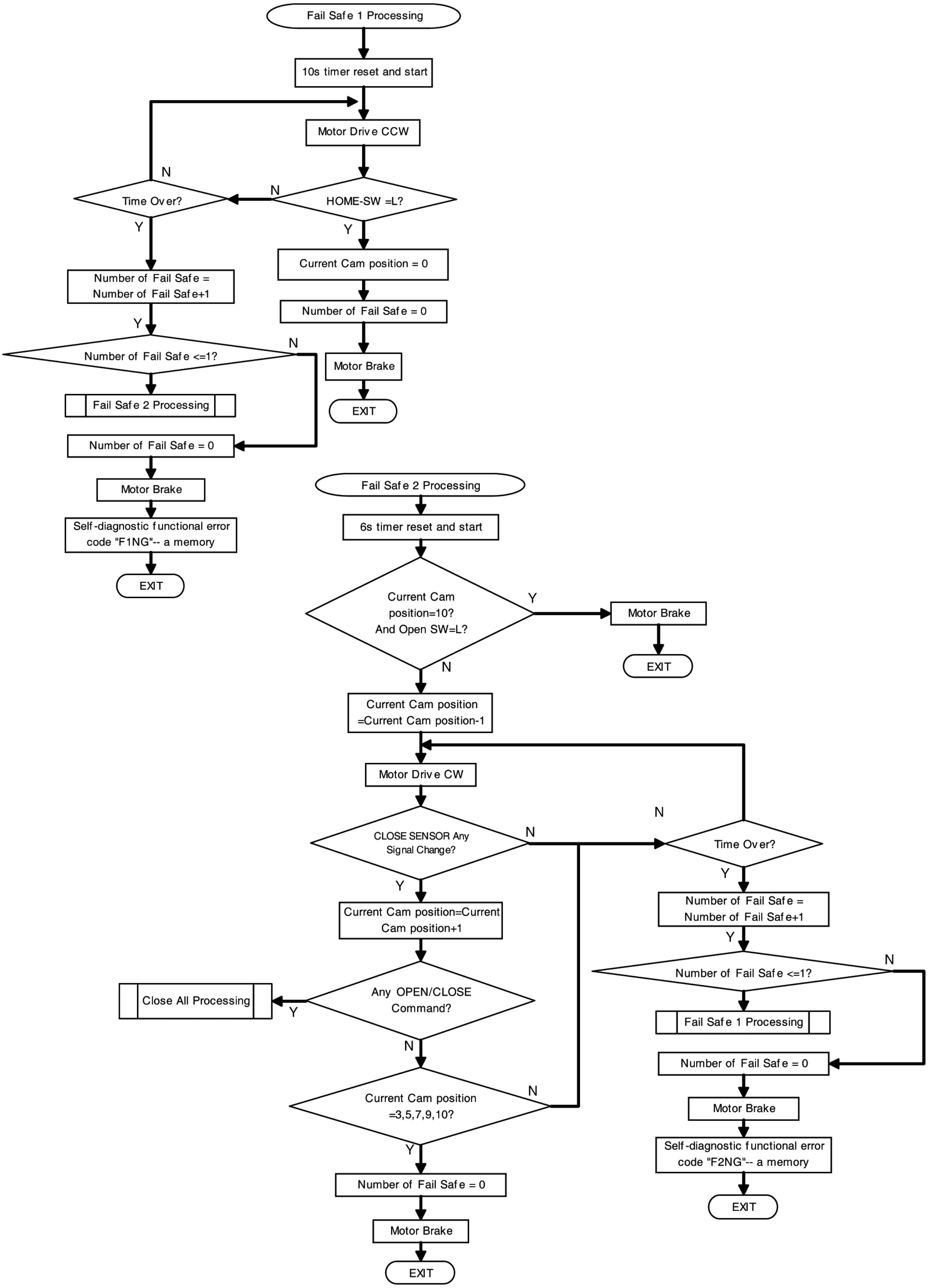
Fail safe 2: Tray can not close: Fail safe - move to next close sensor transition position

Note : For Fail safe 2 :

1. If done on tray 1 - will fully go to Open position because OC gears are fully engaged
2. If done on either one of the remaining trays (2, 3, 4 & 5) - will only release the gear engagement and leave the tray at free condition, tray can only open manually by user.

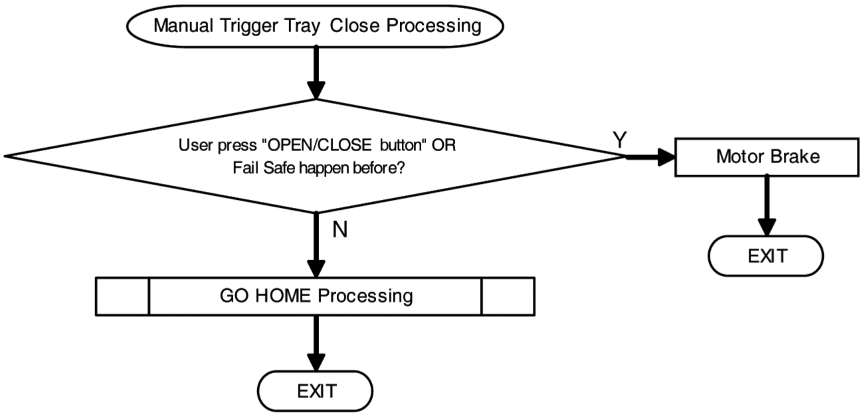
After fail safe, any subsequent button pressed on main set, the mechanism must follow "GO HOME" flowchart.

- Fail safe flow chart are shown as below:


Fail Safe 1 Processing
10s timer reset and start
Motor Drive CCW
HOME-SW =L?
N
Time Over?
N
Y
Y
Current Cam position = 0
Number of Fail Safe = 0
Motor Brake
EXIT
Number of Fail Safe = Number of Fail Safe+1
Y
Number of Fail Safe <=1?
N
Fail Safe 2 Processing
Number of Fail Safe = 0
Motor Brake
Self-diagnostic functional error code "F1NG"-- a memory
EXIT
Fail Safe 2 Processing
6s timer reset and start
Current Cam position=10? And Open SW=L?
Y
Motor Brake
EXIT
N
Current Cam position =Current Cam position-1
Motor Drive CW
CLOSE SENSOR Any Signal Change?
N
N
Time Over?
Y
Y
Current Cam position=Current Cam position+1
Any OPEN/CLOSE Command?
Y
Close All Processing
N
Current Cam position =3,5,7,9,10?
N
Y
Number of Fail Safe = 0
Motor Brake
EXIT
Number of Fail Safe = Number of Fail Safe+1
Y
Number of Fail Safe <=1?
N
Fail Safe 1 Processing
Number of Fail Safe = 0
Motor Brake
Self-diagnostic functional error code "F2NG"-- a memory
EXIT

3.14. Manual Trigger Tray Close

- When user push open tray at full open position, user may able to activate tray to be all close. This function will be disable if user happen to press "OPEN/CLOSE" button and fail safe happen before.


Manual Trigger Tray Close Processing
User press "OPEN/CLOSE button" OR Fail Safe happen before?
Y
Motor Brake
EXIT
N
GO HOME Processing
EXIT

3.15. Changer Error Code

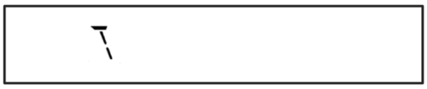
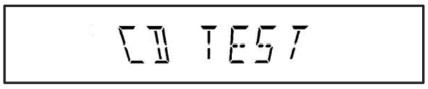
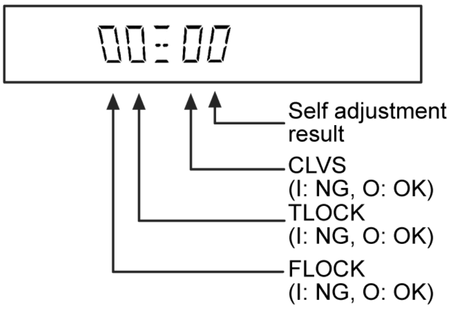
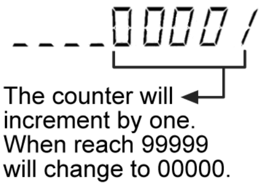
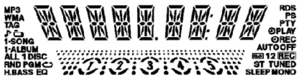
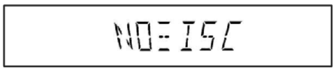
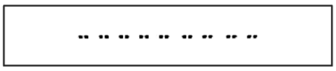
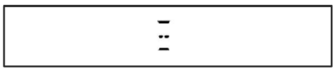
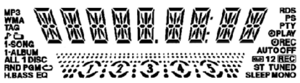
· The error code summary of CRS1 changer is as below:

Error Code	Operation
IHMS	Cam gear rotate to HOME position
ICLS	Cam gear rotate to Play Driving position to drive playing tray to STOCK position
ISTK	Move tray drive rack to STOCK position (drive tray to STOCK position)
IPLY	Move tray drive rack to PLAY position (drive tray to PLAY position)
ITOP	Move UD rack R to front direction (raise UD base to top position)
IUDS	After TOP-SW detect, UD rack move to tray 1 position
HOME	After load tray to PLAY position, cam gear move to HOMEAfter unload to STOCK position, cam gear move to HOME After all tray close, cam gear go to HOME position
LOAD	Tray move from STOCK to PLAY position
UNLD	Tray move from PLAY to STOCK position
PDRV	Cam gear move from HOME to Play Driving position
UDU	UD base move at up direction (from tray 5 to tray 2)
UDD	UD base move at down direction (from tray 1 to tray 5)
UD1	UD base move to tray 1
F1NG	Fail safe 1 NG (Fail safe 1 unsuccessful then try Fail Safe 2 also unsuccesful)
F2NG	Fail safe 2 NG (Fail safe 2 unsuccessful then try Fail Safe 1 also unsuccesful)

4 Self diagnosis and special mode setting

This unit is equipped with functions for checking and inspecting namely: Self-Diagnostic and Test Mode.

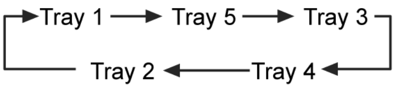
4.1. Special Mode Table

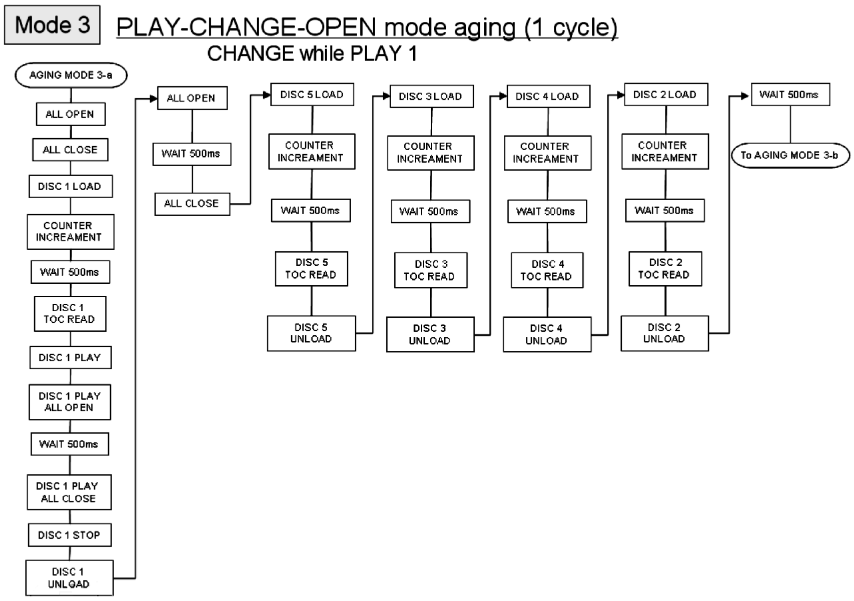
Item		FL Display	Key Operation
Mode Name	**Description**		**Front Key**
Self -Diagnostic Mode	To enter into self diagnostic checking for main unit.		1. Select [►, TAPE] for TAPE mode (Ensure no tape is inserted). 2. Press and hold [■, STOP]button for 3 seconds follow by [►►I, ∧/FF]. To exit, press [⏻/I, POWER] button on main unit or remote control.
CD Test Mode	To enter into checking the reliability of changer unit.		1. Select [►/II, CD] for CD mode. 2. Press and hold [■, STOP] button for 3 seconds follow by [►►I, ∧/FF]. To exit, press [⏻/I, POWER] button on main unit or remote control.
CD Auto Adjustment	To check the CD auto adjustment result for FLOCK, TLOCK and CLVS.	 00:00 Self adjustment result CLVS (I: NG, O: OK) TLOCK (I: NG, O: OK) FLOCK (I: NG, O: OK)	In CD Test Mode: 1. Press [0] button on the remote control. To exit, press [⏻/I, POWER] button on main unit or remote control.
CD Changer Reliability Test (CRS1)	To determine the reliability of CD Changer Unit. (For more information, refer to section 4.1.1)	 ----00001 The counter will increment by one. When reach 99999 will change to 00000.	In Self-Diagnostic Mode: 1. Select [►/II, CD] for CD mode. 2. Press [I◄◄, REW/∨] button. To exit, press [⏻/I, POWER] button on main unit or remote control. (The tray will return to PLAY position and then power off)
Doctor Mode	To enter into Doctor Mode for checking of various items and displaying EEPROM and firmware version.	1.  2.  1. All segments will light up for 1 second. 2. The Check Sum of EEPROM and firmware version will be display. * ROM correction ** Firmware version No:	In any mode: 1. Press [■, STOP] button on main unit follow by [4] and [7] on remote control. To exit, press [ENTER] button on remote control or [⏻/I, POWER] button on main unit or remote control.
Cold Start	To activate cold start upon next AC power up.		In doctor mode: 1. Press [4] button on remote control. To exit, press [ENTER] button on remote control or [⏻/I, POWER] button on main unit or remote control.
Changer Reliability Test	To check the function operation of changer unit. (For more information, refer to 4.1.1)		In doctor mode: 1. Press [DISC] on remote control. To exit, press [ENTER] button on remote control or [⏻/I, POWER] button on main unit or remote control.
FL Display Test	To check the FL segments display (All segments will light up and LED will blink at 0.5 second interval)		In doctor mode: 1. Press [PROGRAM] button on remote control.

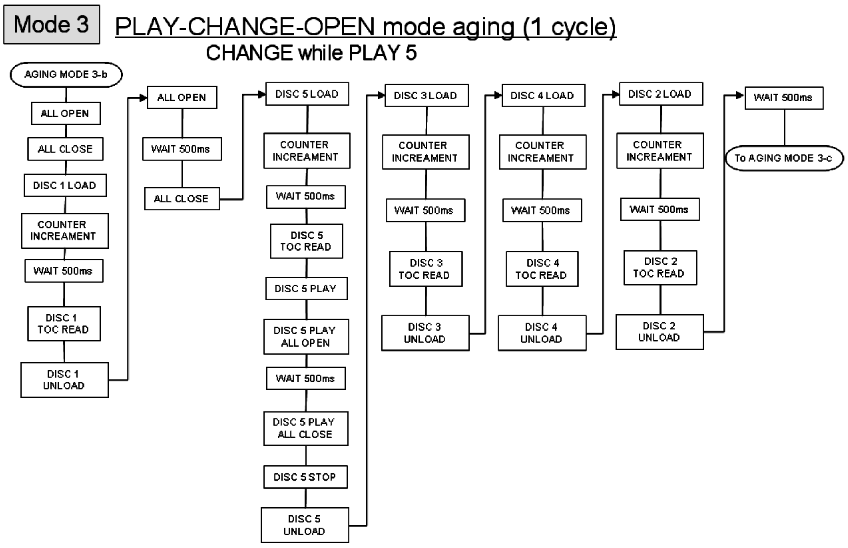
Item		**FL Display**	**Key Operation**
Mode Name	**Description**		**Front Key**
Tape Eject Test	To check on the tape eject function (For deck 1/2)		In doctor mode: 1. Press [PROGRAM] button on remote control.

4.1.1. CD changer unit ageing test mode

Below is the process flow chart of ageing for the CD changer unit.

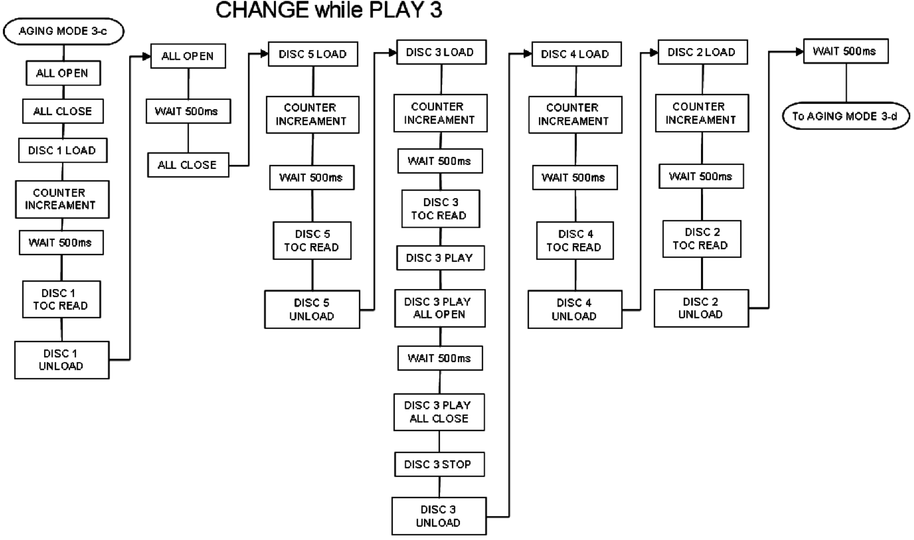

Tray 1
Tray 5
Tray 3
Tray 4
Tray 2


Mode 3
PLAY-CHANGE-OPEN mode aging (1 cycle)
CHANGE while PLAY 1
AGING MODE 3-a
ALL OPEN
ALL CLOSE
DISC 1 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 1 TOC READ
DISC 1 PLAY
DISC 1 PLAY ALL OPEN
WAIT 500ms
DISC 1 PLAY ALL CLOSE
DISC 1 STOP
DISC 1 UNLOAD
ALL OPEN
WAIT 500ms
ALL CLOSE
DISC 5 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 5 TOC READ
DISC 5 UNLOAD
DISC 3 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 3 TOC READ
DISC 3 UNLOAD
DISC 4 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 4 TOC READ
DISC 4 UNLOAD
DISC 2 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 2 TOC READ
DISC 2 UNLOAD
WAIT 500ms
To AGING MODE 3-b


Mode 3
PLAY-CHANGE-OPEN mode aging (1 cycle)
CHANGE while PLAY 5
AGING MODE 3-b
ALL OPEN
ALL CLOSE
DISC 1 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 1 TOC READ
DISC 1 UNLOAD
ALL OPEN
WAIT 500ms
ALL CLOSE
DISC 5 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 5 TOC READ
DISC 5 PLAY
DISC 5 PLAY ALL OPEN
WAIT 500ms
DISC 5 PLAY ALL CLOSE
DISC 5 STOP
DISC 5 UNLOAD
DISC 3 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 3 TOC READ
DISC 3 UNLOAD
DISC 4 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 4 TOC READ
DISC 4 UNLOAD
DISC 2 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 2 TOC READ
DISC 2 UNLOAD
WAIT 500ms
To AGING MODE 3-c

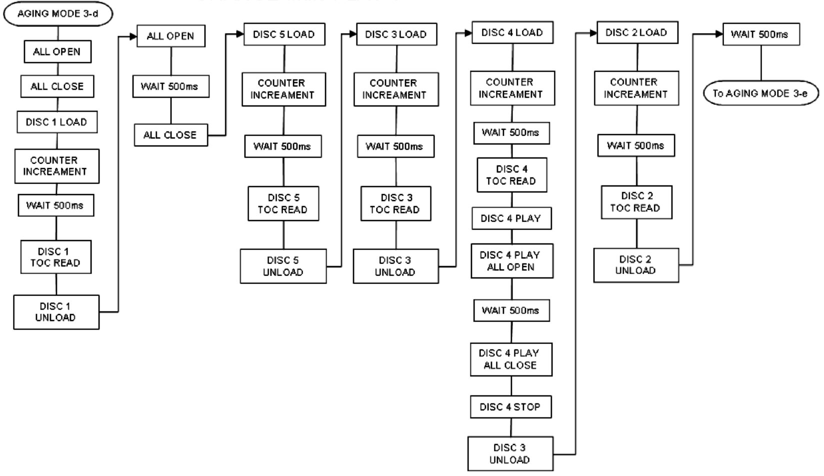
Mode 3 PLAY-CHANGE-OPEN mode aging (1 cycle)

CHANGE while PLAY 3


AGING MODE 3-c
ALL OPEN
ALL CLOSE
DISC 1 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 1 TOC READ
DISC 1 UNLOAD
ALL OPEN
WAIT 500ms
ALL CLOSE
DISC 5 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 5 TOC READ
DISC 5 UNLOAD
DISC 3 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 3 TOC READ
DISC 3 PLAY
DISC 3 PLAY ALL OPEN
WAIT 500ms
DISC 3 PLAY ALL CLOSE
DISC 3 STOP
DISC 3 UNLOAD
DISC 4 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 4 TOC READ
DISC 4 UNLOAD
DISC 2 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 2 TOC READ
DISC 2 UNLOAD
WAIT 500ms
To AGING MODE 3-d

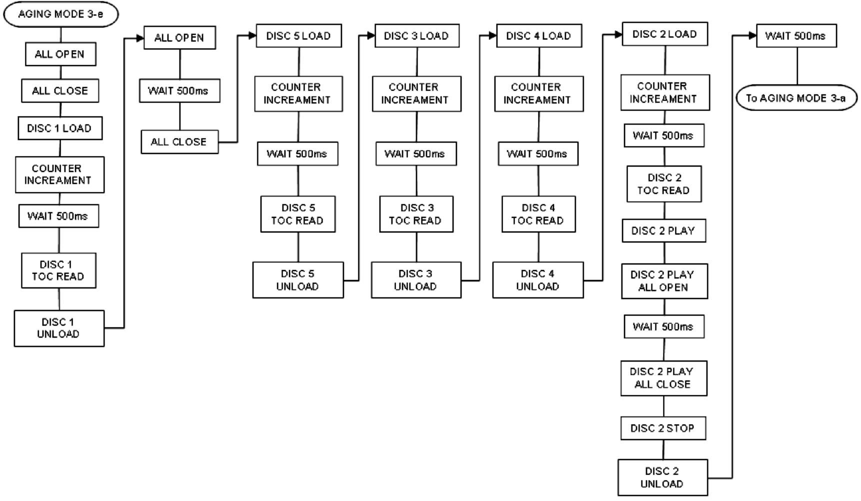
Mode 3 PLAY-CHANGE-OPEN mode aging (1 cycle)

CHANGE while PLAY 4


AGING MODE 3-d
ALL OPEN
ALL CLOSE
DISC 1 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 1 TOC READ
DISC 1 UNLOAD
ALL OPEN
WAIT 500ms
ALL CLOSE
DISC 5 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 5 TOC READ
DISC 5 UNLOAD
DISC 3 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 3 TOC READ
DISC 3 UNLOAD
DISC 4 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 4 TOC READ
DISC 4 PLAY
DISC 4 PLAY ALL OPEN
WAIT 500ms
DISC 4 PLAY ALL CLOSE
DISC 4 STOP
DISC 3 UNLOAD
DISC 2 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 2 TOC READ
DISC 2 UNLOAD
WAIT 500ms
To AGING MODE 3-e

Mode 3 PLAY-CHANGE-OPEN mode aging (1 cycle)

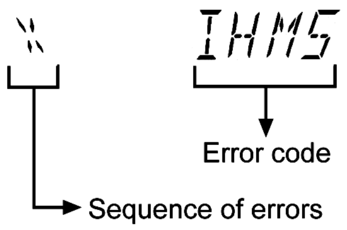
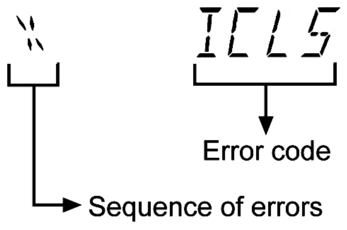
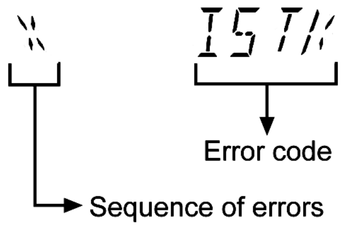
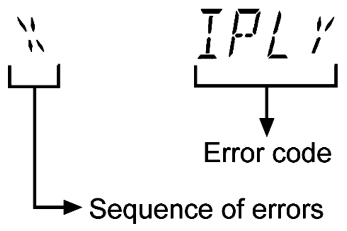
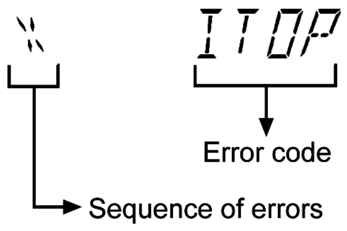
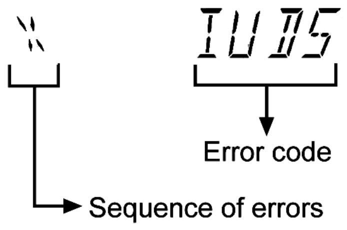
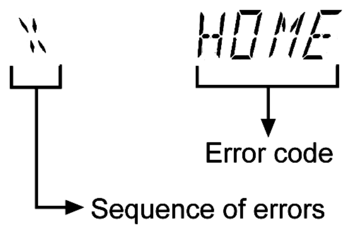
CHANGE while PLAY 2

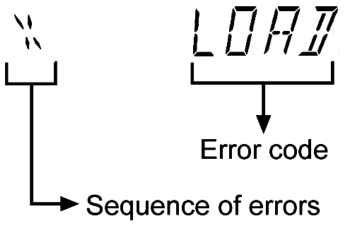
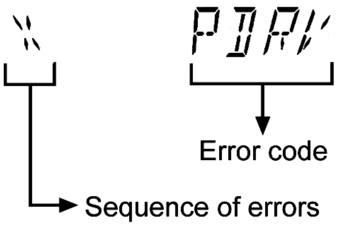
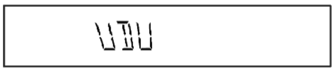
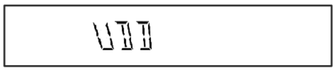
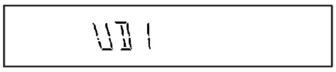
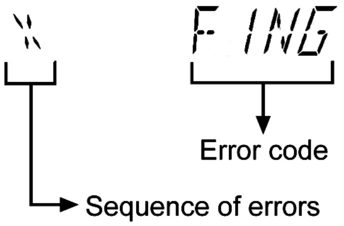
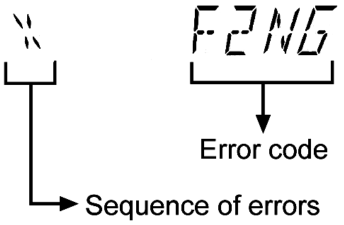
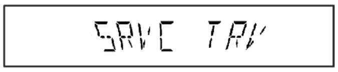
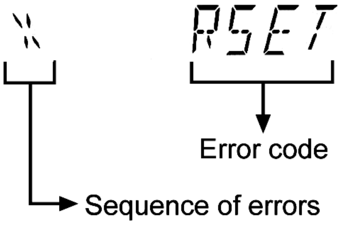

AGING MODE 3-e
ALL OPEN
ALL CLOSE
DISC 1 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 1 TOC READ
DISC 1 UNLOAD
ALL OPEN
WAIT 500ms
ALL CLOSE
DISC 5 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 5 TOC READ
DISC 5 UNLOAD
DISC 3 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 3 TOC READ
DISC 3 UNLOAD
DISC 4 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 4 TOC READ
DISC 4 UNLOAD
DISC 2 LOAD
COUNTER INCREAMENT
WAIT 500ms
DISC 2 TOC READ
DISC 2 PLAY
DISC 2 PLAY ALL OPEN
WAIT 500ms
DISC 2 PLAY ALL CLOSE
DISC 2 STOP
DISC 2 UNLOAD
WAIT 500ms
To AGING MODE 3-a

4.2. Error code Table

Self-Diagnosis Function (refer Section 4.1) provides information on any problems occuring for the unit and its respective components by displaying the error codes. These error code such as U**, H** and F** are stored in memory and held unless it is cleared.

The error code is automatically display after entering into self-diagnostic mode.

Error Code	Diagnosis Contents	Description of error	Automatic FL Display	Remarks
IHMS	Cam gear abnormality	Cam gear does not rotate to “HOME” position.	 IHMS Error code Sequence of errors	For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
ICSL	Cam gear/gear units abnormal	Cam gear does not rotate to “PLAY” driving position and hence does not drive playing tray to “STOCK” position.	 ICLS Error code Sequence of errors	For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
ISTK	Drive rack/gear assembly abnormal	The tray drive rack does not move to “STOCK” position. (Tray does not move to “STOCK” position)	 ISTK Error code Sequence of errors	For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
IPLY	Drive rack/gear assembly abnormal	The tray drive rack does not move to “PLAY” position. (Tray does not move to “PLAY” position)	 IPLY Error code Sequence of errors	For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
ITOP	UD assembly	UD Rack does not move to front direction. This lead to UD base not raise to top position.	 ITOP Error code Sequence of errors	For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
IUDS	UD assembly	After TOP SW is detected, UD rack does not move into tray 1 position.	 IUDS Error code Sequence of errors	For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
HOME	Cam gear/gear assembly abnormal	Cam gear does not move to “HOME” position under following conditions 1. After tray is load to “PLAY” position. 2. After tray is unload to “STOCK” position.	 HOME Error code Sequence of errors	For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.

Error Code	Diagnosis Contents	Description of error	Automatic FL Display	Remarks
LOAD	Tray drive assembly abnormal	Tray unit does not move from “STOCK” to “PLAY” position		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
PDRV	Cam gear/gear assembly abnormal	Cam gear does not move from “HOME” to “PLAY” drive position.		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
UDU	UD base asssembly abnormal	UD Base assembly does not move upwards from tray 5 to tray 2		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
UDD	UD base asssembly abnormal	UD Base assembly does not move downwards from tray 1 to tray 5.		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
UD1	UD base asssembly abnormal	UD Base assembly does not move to tray 1.		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
F1NG	Fail - safe mode. (For open/close tray unit(s))	When the tray open operation is performed, it fails to open. It will automatically close all trays after the time-out by the microprocessor. During this time when it fails, the error code will appear.		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
F2NG	Fail - safe mode. (For open/close tray unit(s))	When the tray close operation is performed, it fails to close. It will automatically open all trays after the time-out by the microprocessor. During this time when it fails, the error code will appear.		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.
SRVC_TRV	To unlock the traverse unit for service	1. All trays set to “STOCK” position 2. Mechanism set to tray 5 3. Cam gear set to “HOME” position		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit.
RSET	Cam gear jam/close sensor faulty	During tray re-open, the cam gear will rotate in the opposite direction to reset the cam gearposition. When it fails, the error code will appear.		For CD changer unit (CRS1). Press [SINGLE CHANGE] on main unit for next error.

CRS1 Error Code display

1. The errors that occured in CRS1 Mechanism can be recalled and displayed, in the order of the occurence under self-diagnostic (Refer to Section 4.1 for procedures to enter this mode.
    - Only the first 5 errors will be memorized (in backup memory). The subsequence error shall be ignored and not memorize. For system with EEPROM as memory backup,memory space in EEPROM is neccesary.
2. To display all error code memorized

In CRS1 Self-Diagnostic mode, press [SINGLE CHANGE] to display subsequence error code.

It shall repeat after reaching error no. 5.

e.g.:

[1 _ _ _ _ I H M S] → [SINGLE CHANGE]
[2 _ _ _ _ I T O P] → [SINGLE CHANGE]
[3 _ _ _ _ H O M E] → [SINGLE CHANGE]
[4 _ _ _ _ L O A D] → [SINGLE CHANGE]
[5 _ _ _ _ _ U D D] → [SINGLE CHANGE]

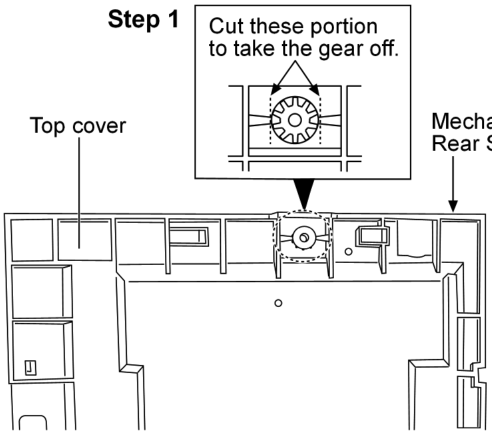
3. To clear the error code memory

   In CRS1 Self-Diagnostic mode, long press [SINGLE CHANGE] key (2s or more)

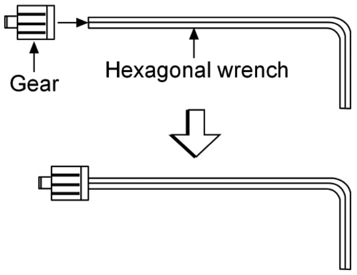
5 Troubleshooting Explorer

5.1. Preparation of service jig

- This unit has a gear which is used for checking items (open/close of disc tray, up/down operation of traverse unit by manually) when servicing. (For gear information, that is described on the items for disassembly procedures.)
- For preparation of gear (for servicing), perform the procedures as follows.
- In case of re-servicing the same set, the “gear for servicing” may be took off because it had been used. So, the “gear for servicing” must be stored.


Step 1
Cut these portion to take the gear off.
Top cover
Mechanism Rear Side

Step 2: Insert the gear into the hexagonal wrench.


Gear
Hexagonal wrench

(Preparation of gear as jig is completed)

5.2. Checking of Changer Unit

Below is the procedures for checking the function of the changer unit.

Step 1: Enter into doctor mode.

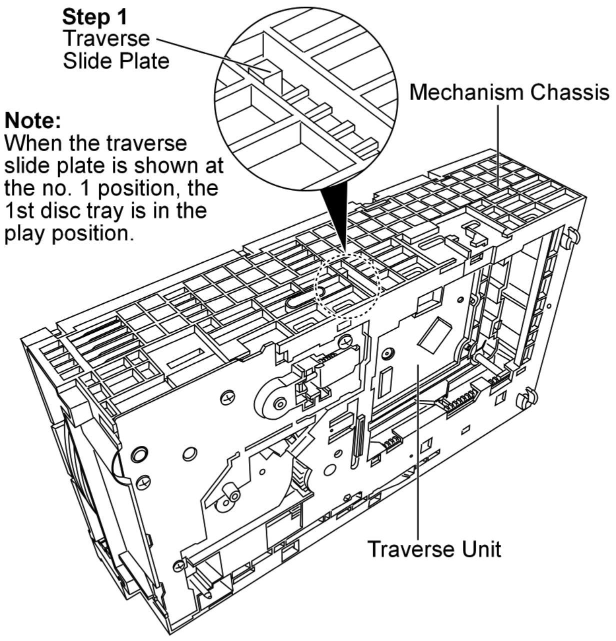
Step 2: Press [DISC] on remote control unit.

Step 3: Error code will appear if there is any function problems. (Pls refer to section 4.2 on more information of error code).

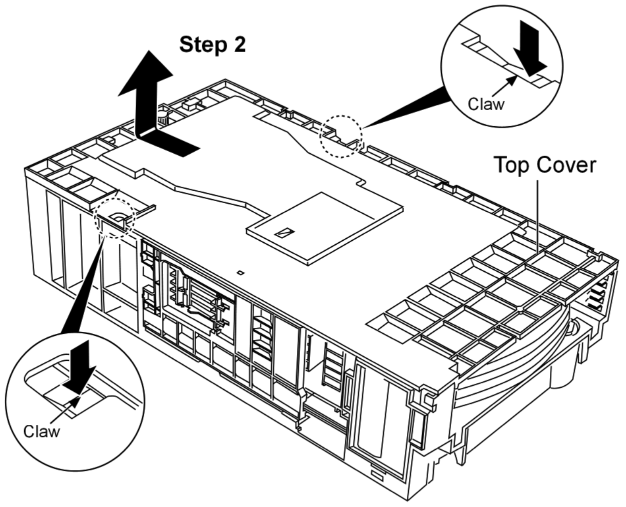
5.3. Setting the trays in "STOCK" position

- Below is procedures for setting the main unit into service mode:-
  1. Enter into self-diagnostic (Refer to section 4.1)
  2. Press [SINGLE CHANGE] on main unit.
- If fail to set the main unit into service mode, do it manually by the below procedures

5.3.1. No CD in the tray

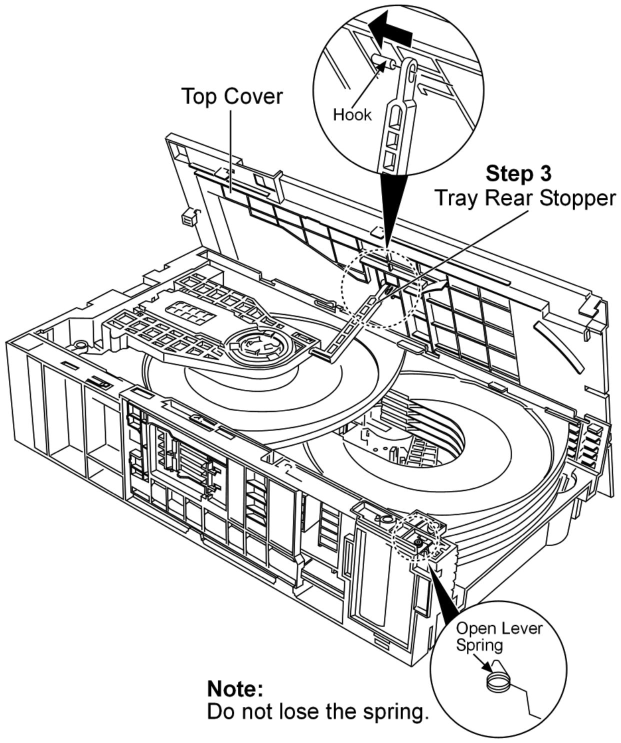

Step 1
Traverse Slide Plate
Mechanism Chassis
Note:
When the traverse slide plate is shown at the no. 1 position, the 1st disc tray is in the play position.
Traverse Unit

Step 1: Check any disc tray at the play position from the mechanism side.

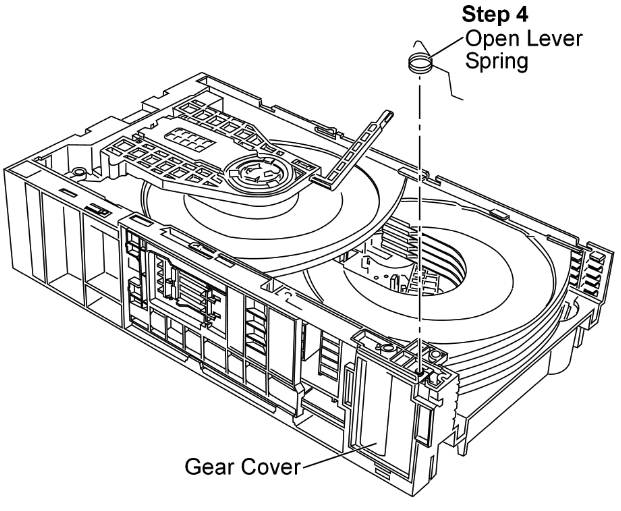

Step 2
Claw
Top Cover
Claw

Step 2: Press the 2 claws and then lift up the top cover as arrows shown.

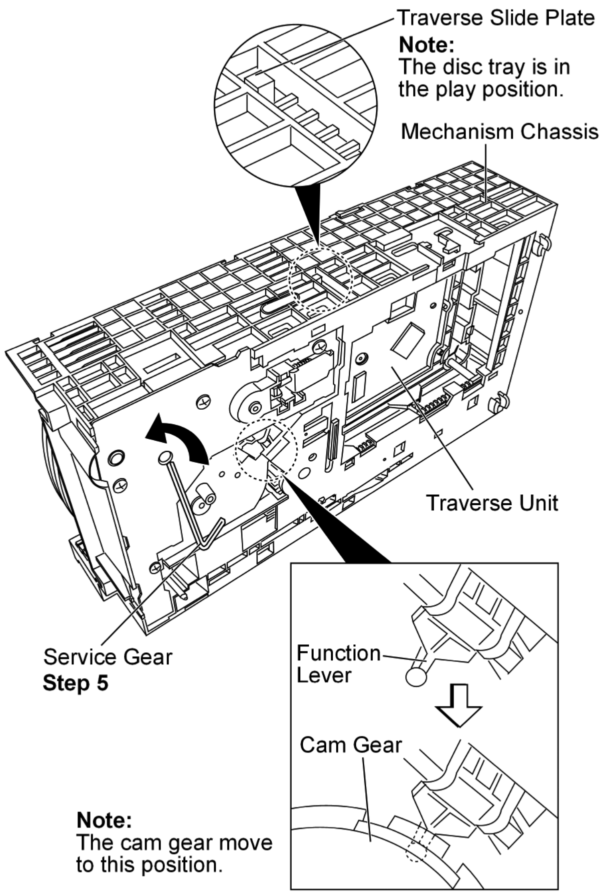
Caution: Do not exert strong force on the claws.


Hook
Top Cover
Step 3
Tray Rear Stopper
Open Lever Spring
Note:
Do not lose the spring.

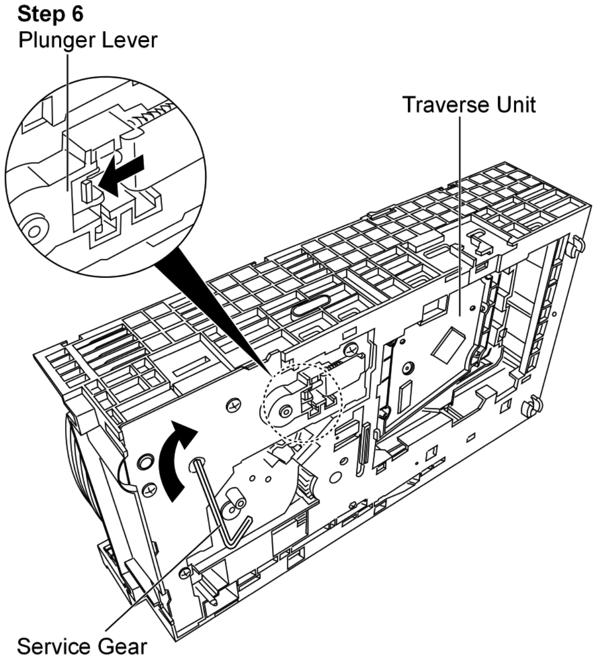
Step 3: Release the top cover from the tray rear stopper as arrow shown and remove the top cover.


Step 4
Open Lever Spring
Gear Cover

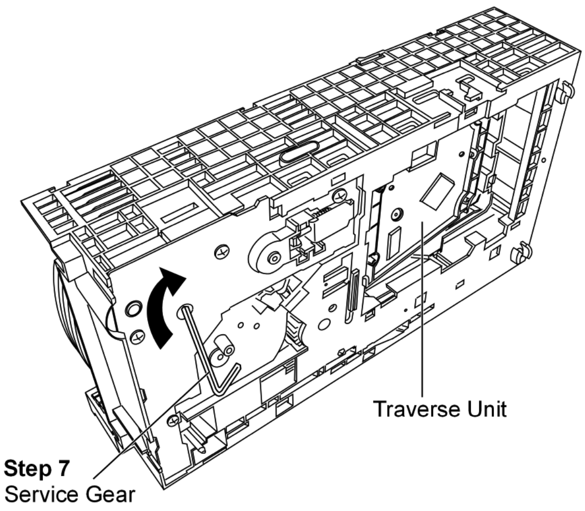
Step 4: Remove the open lever spring.


Traverse Slide Plate
Note:
The disc tray is in the play position.
Mechanism Chassis
Traverse Unit
Service Gear
Step 5
Function Lever
Cam Gear
Note:
The cam gear move to this position.

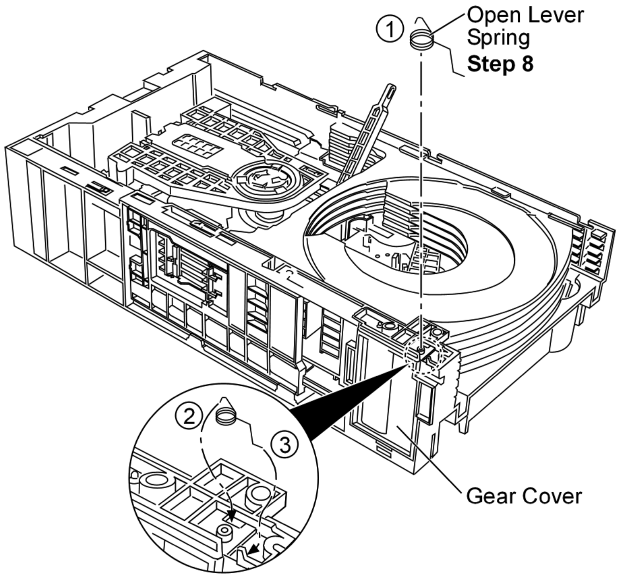
Step 5: Insert the service gear into the service hole and rotate the gear anti-clockwise.


Step 6
Plunger Lever
Traverse Unit
Service Gear

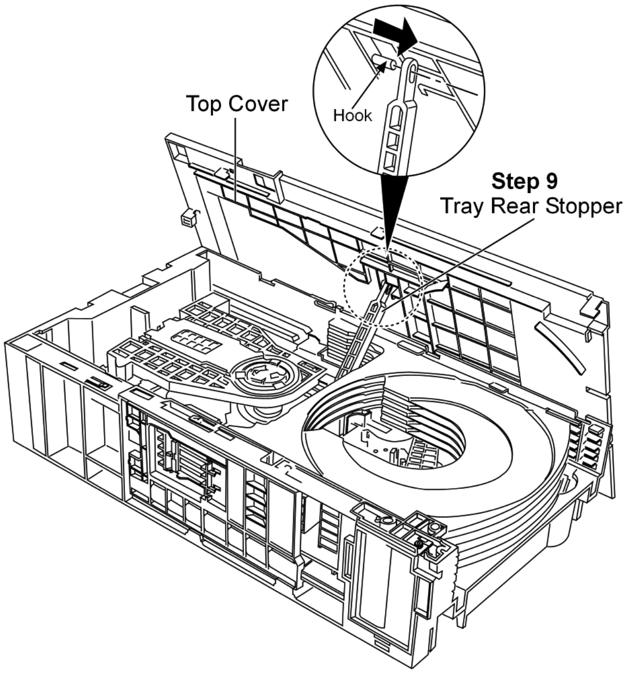
Step 6: Press and hold the plunger lever and rotate the gear clockwise until it stop.


Traverse Unit
Step 7
Service Gear

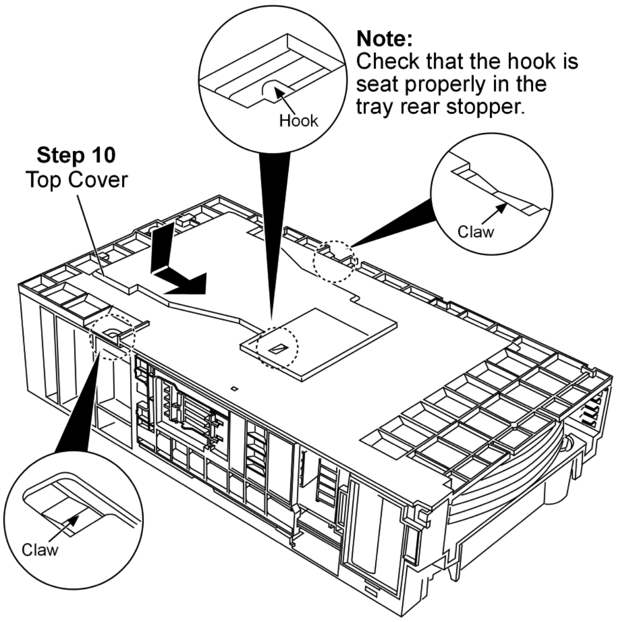
Step 7: Release the plunger lever, rotate the gear clockwise continuously until it stop at “HOME” position.


①
Open Lever Spring
Step 8
②
③
Gear Cover

Step 8: Install the open lever spring as shown.


Top Cover
Hook
Step 9
Tray Rear Stopper

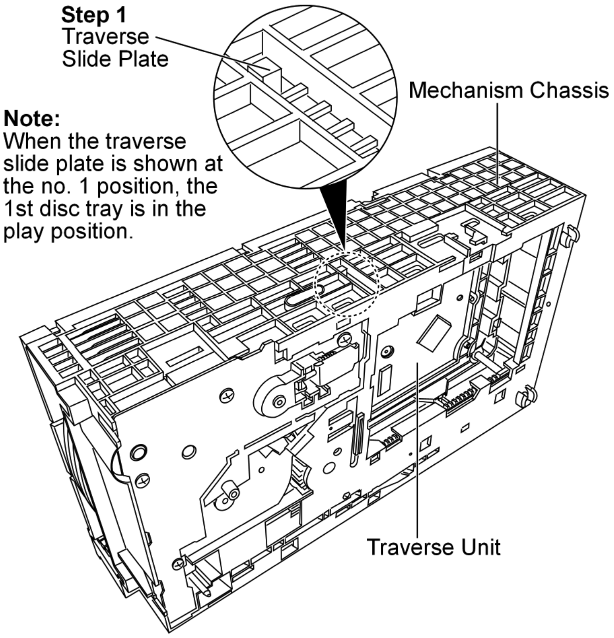
Step 9: Install the top cover, fix the top cover hook to the tray rear stopper as arrow shown.


Hook
Step 10
Top Cover
Claw
Claw

Note:
Check that the hook is seat properly in the tray rear stopper.

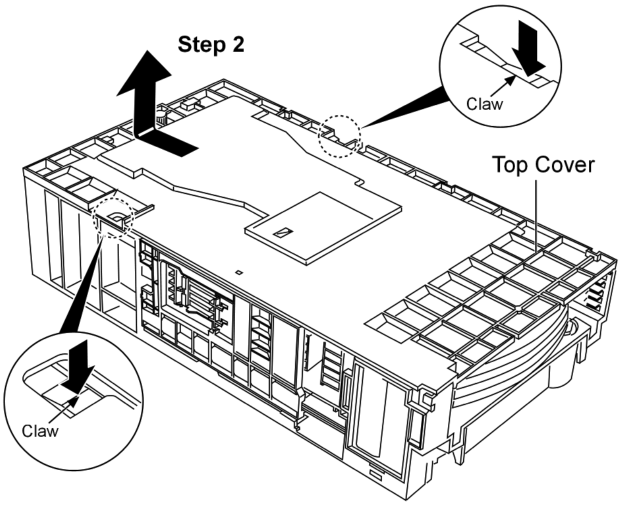
Step 10: Fix the top cover as arrow shown, the 2 claws should be latched.

5.3.2. When CD in the tray


Step 1
Traverse Slide Plate
Mechanism Chassis
Traverse Unit

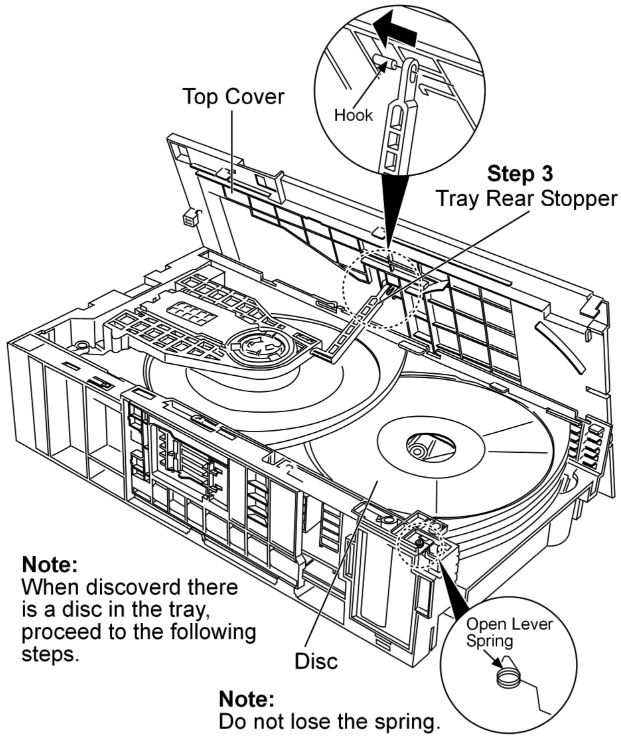
Note:
When the traverse slide plate is shown at the no. 1 position, the 1st disc tray is in the play position.

Step 1: Check any disc tray at the play position from the mechanism side.


Step 2
Claw
Top Cover
Claw

Step 2: Press the 2 claws and then lift up the top cover as arrows shown.

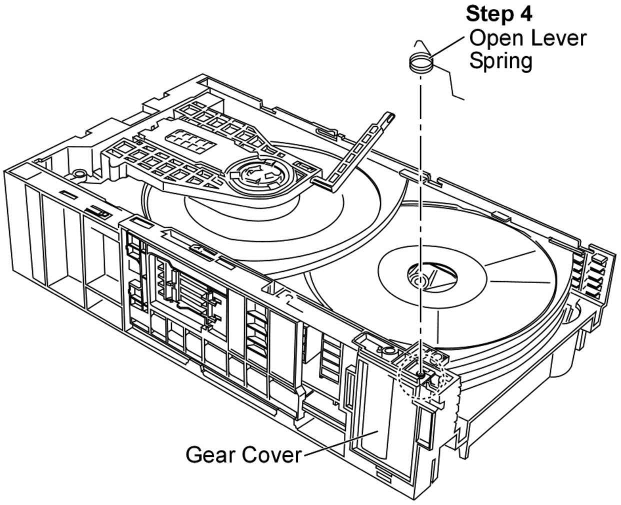
Caution: Do not exert strong force on the claws.


Top Cover
Hook
Step 3
Tray Rear Stopper
Disc
Open Lever Spring

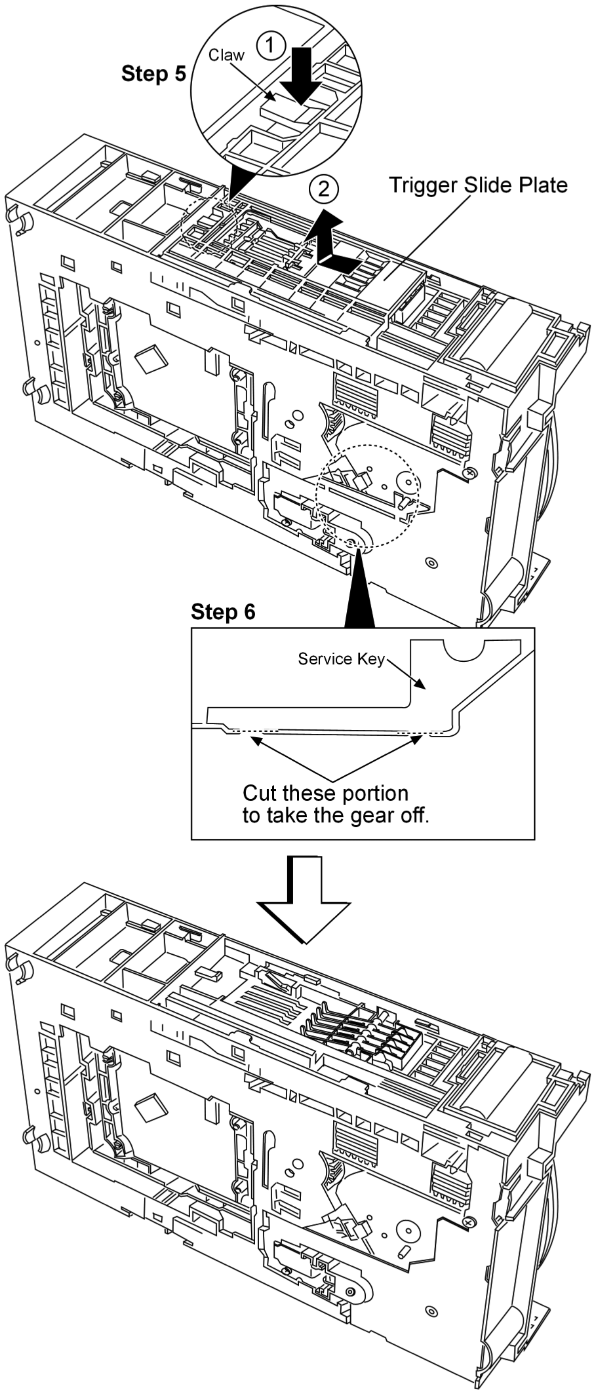
Note:
When discoverd there is a disc in the tray, proceed to the following steps.

Note:
Do not lose the spring.

Step 3: Release the top cover from the tray rear stopper as arrow shown and remove the top cover.

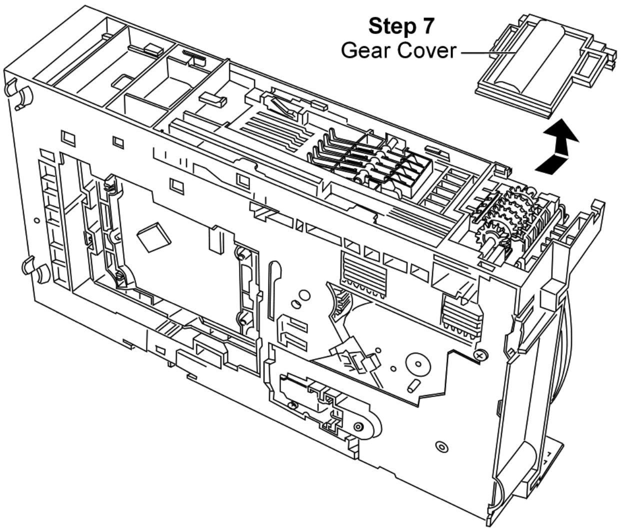

Step 4
Open Lever Spring
Gear Cover

Step 4: Remove the open lever spring.

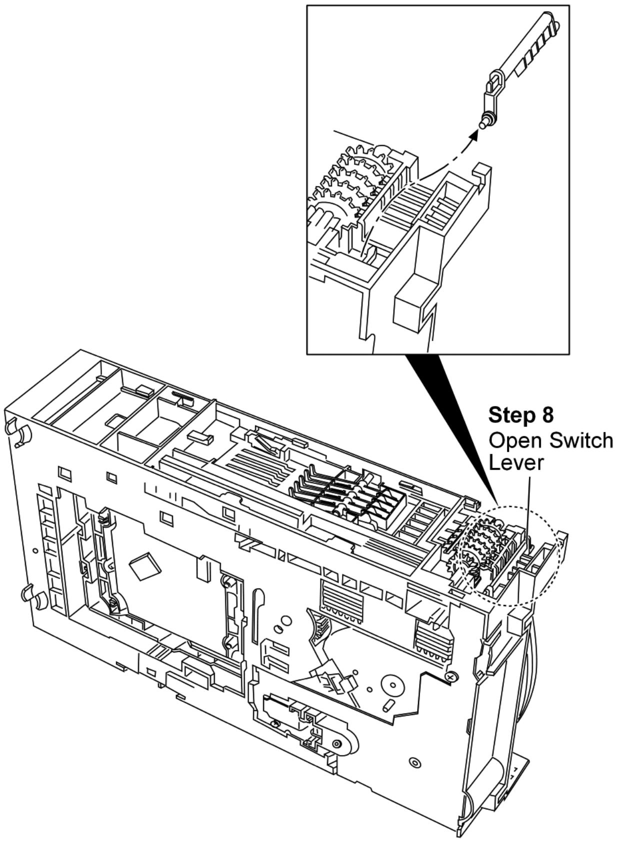

Step 5
Claw
①
②
Trigger Slide Plate
Step 6
Service Key
Cut these portion
to take the gear off.

Step 5: Press the claw, push backwards and remove the trigger slide plate as arrows shown.

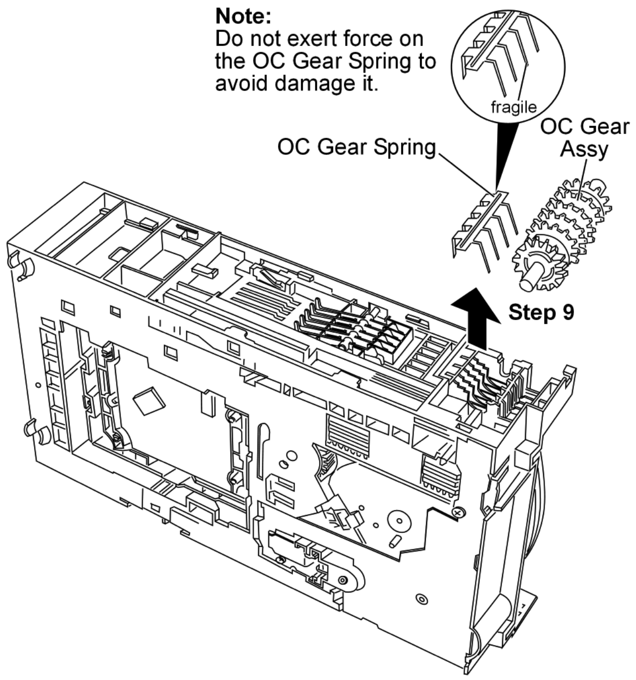
Step 6: Prepare the service key for use.


Step 7
Gear Cover

Step 7: Push forward and remove the gear cover as arrow shown.

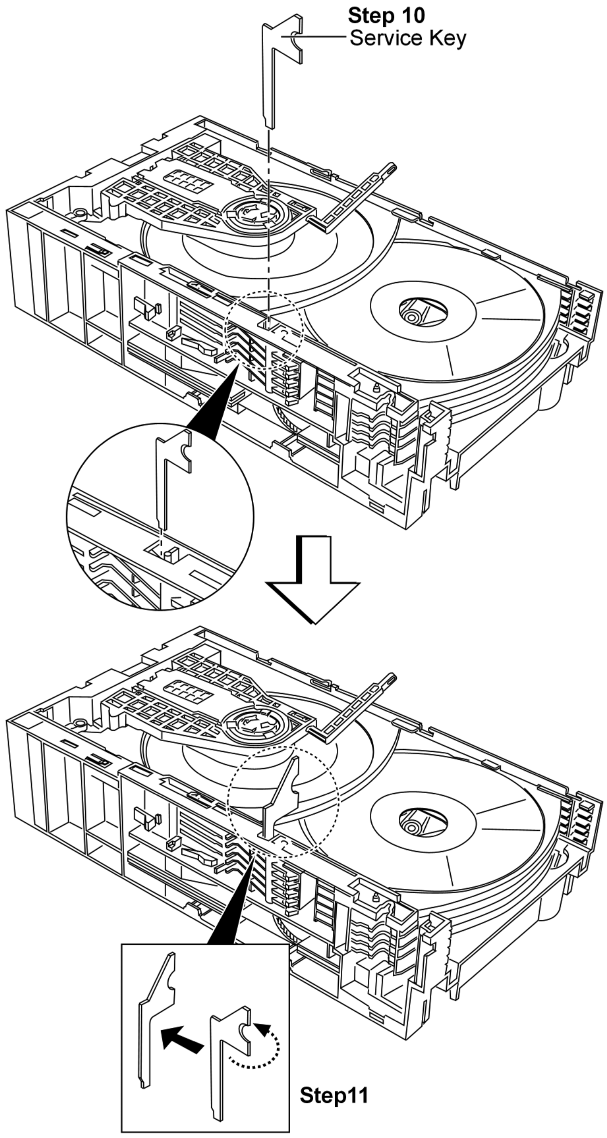

Step 8
Open Switch
Lever

Step 8: Remove the open switch lever.


Note:
Do not exert force on the OC Gear Spring to avoid damage it.
fragile
OC Gear Spring
OC Gear Assy
Step 9

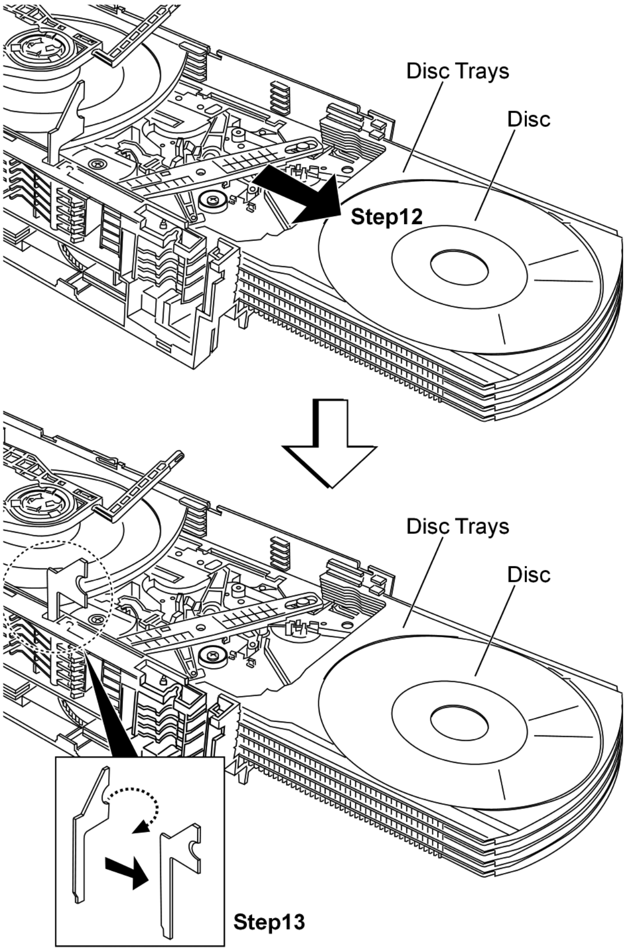
Step 9: Remove the OC gear assy followed by the OC gear spring as arrow shown.

Caution: Ensure the OC gear assy and OC gear spring are handle properly and keep them in a safe place.


Step 10
Service Key
Step11

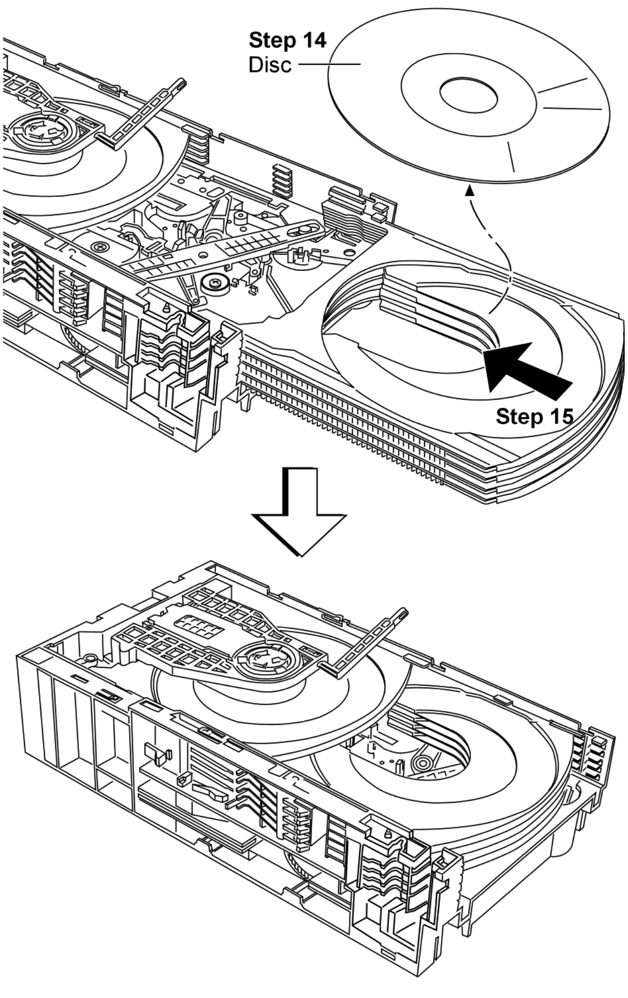
Step 10: Insert the service key into the hole.

Step 11: Turn the service key to release the tray lock lever.


Disc Trays
Disc
Step12
Disc Trays
Disc
Step13

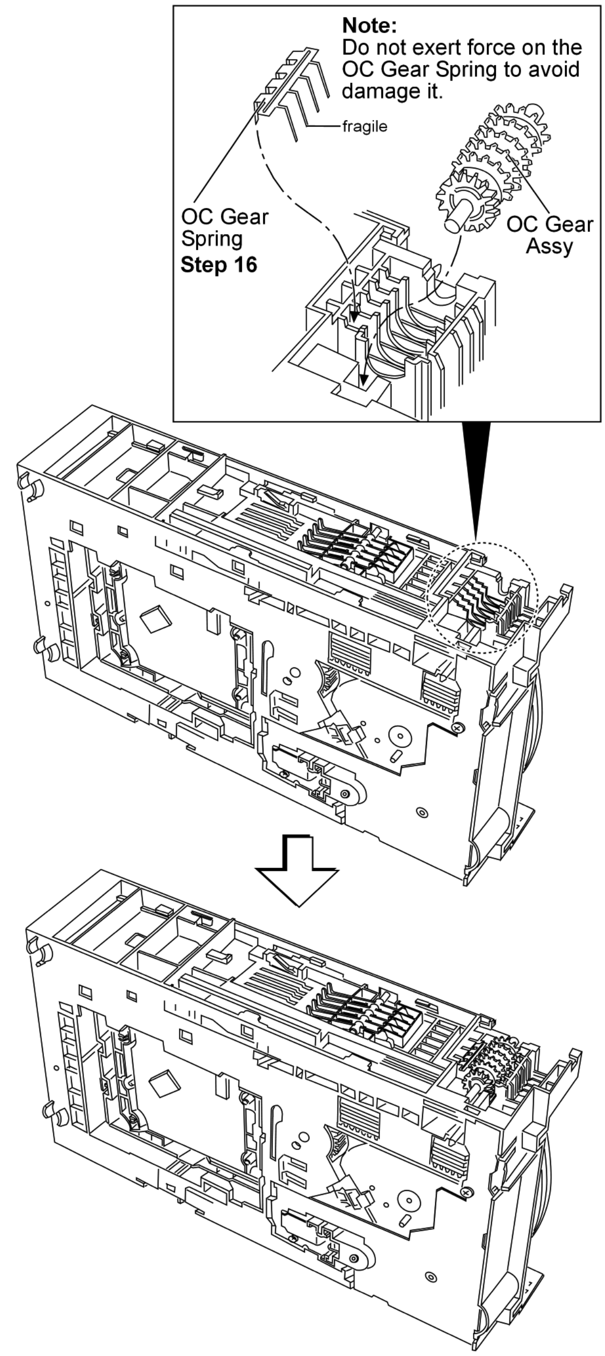
Step 12: Push the disc trays towards the front as arrow shown.

Step 13: Turn the service key back to its original position and remove it.


Step 14
Disc
Step 15

Step 14: Remove the disc.

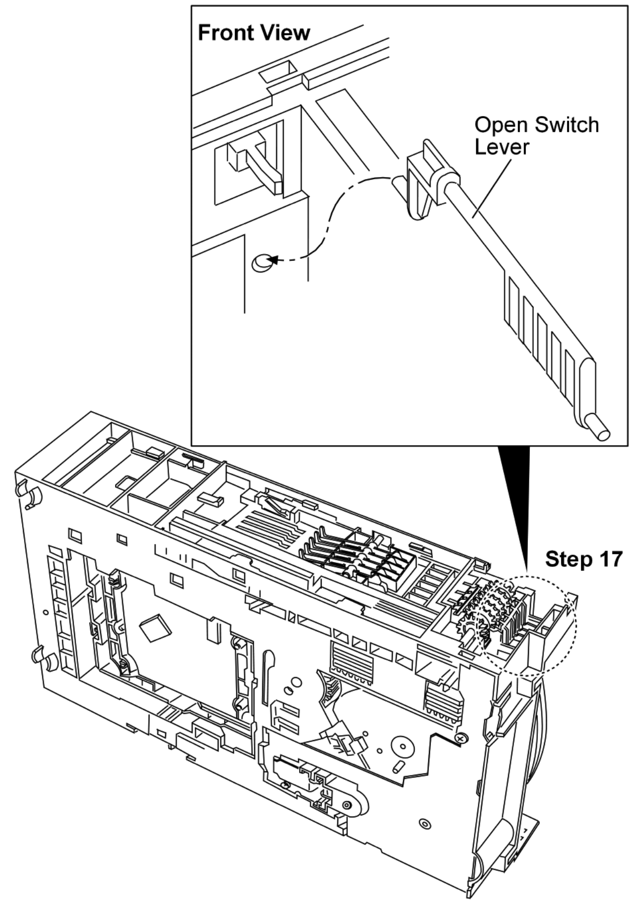
Step 15: Push the disc trays back to the unit as arrow shown.



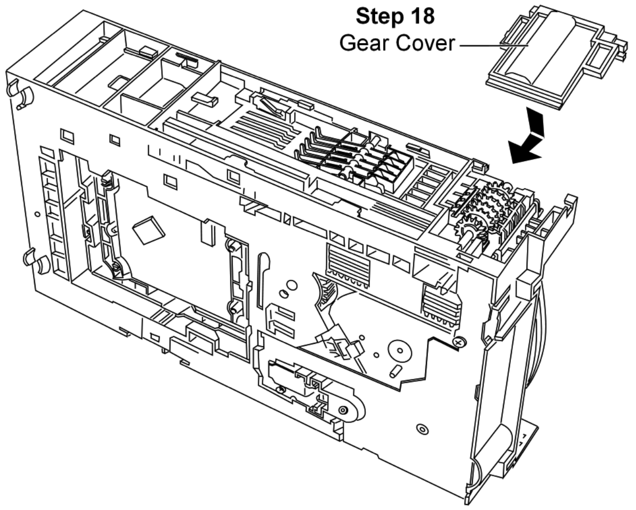
Note:
Do not exert force on the OC Gear Spring to avoid damage it.

fragile
OC Gear Spring
Step 16
OC Gear Assy

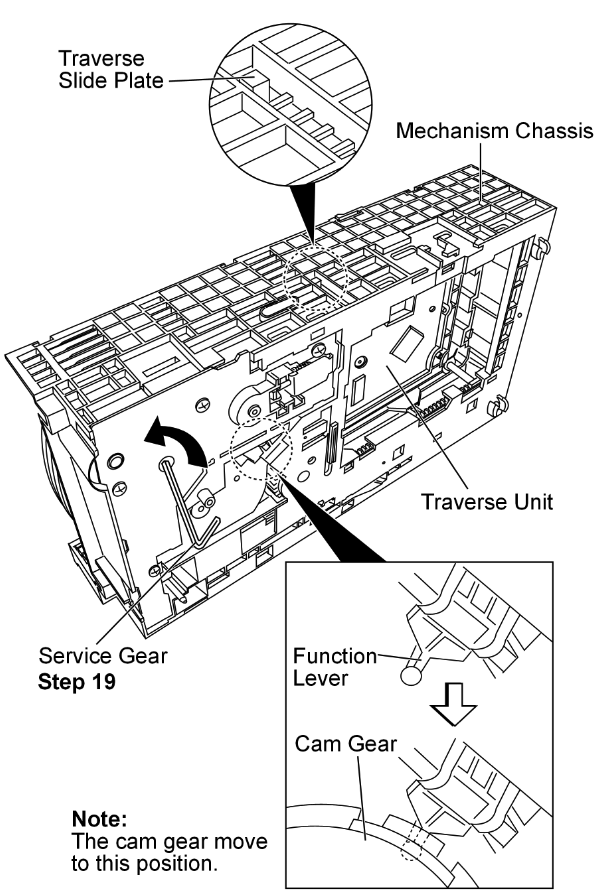
Step 16: Install the OC gear assy followed by the OC gear spring.


Front View
Open Switch Lever
Step 17

Step 17: Install the open switch lever.

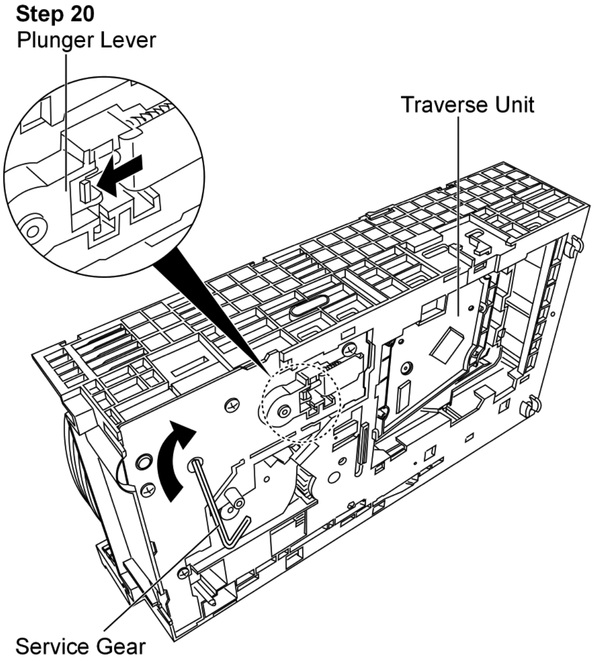

Step 18
Gear Cover

Step 18: Install the gear cover as arrow shown.

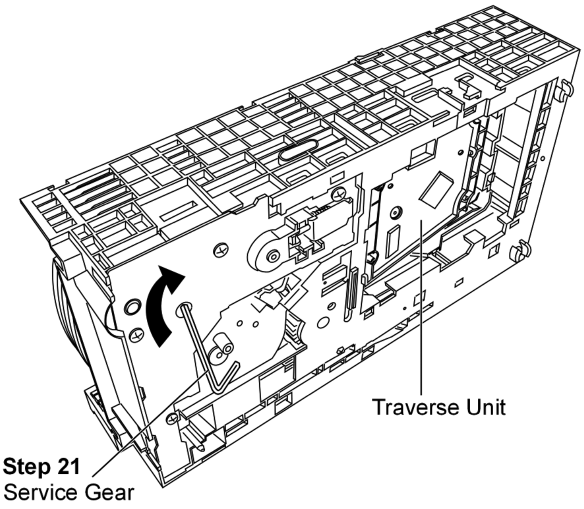

Traverse Slide Plate
Mechanism Chassis
Traverse Unit
Service Gear
Step 19
Function Lever
Cam Gear

Note:
The cam gear move to this position.

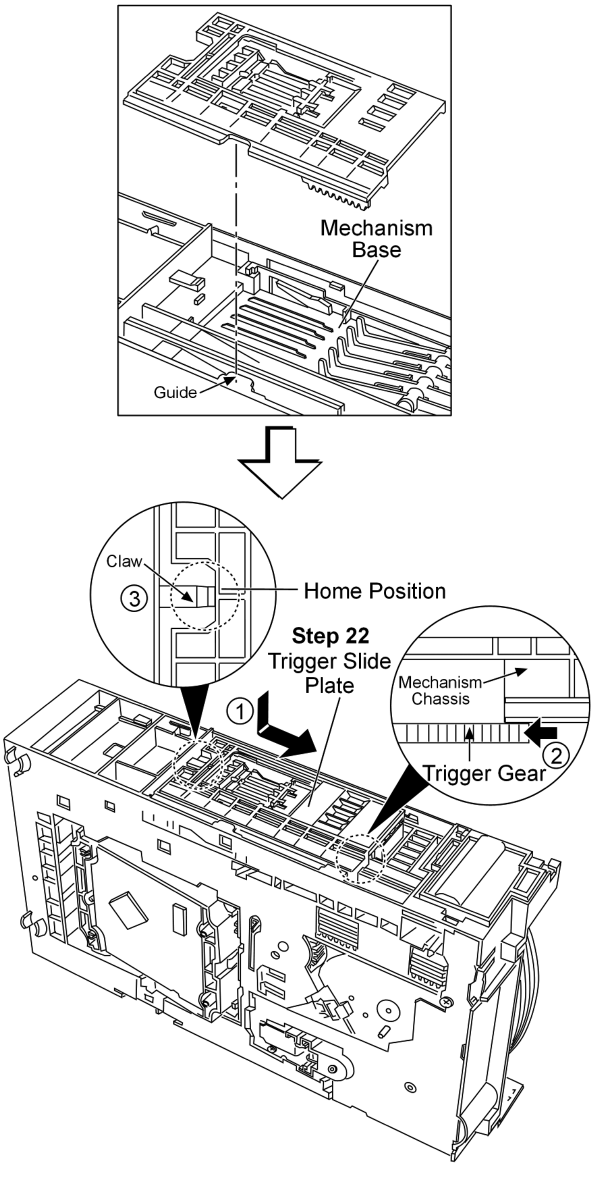
Step 19: Insert the service gear into the service hole and rotate the gear anti-clockwise.


Step 20
Plunger Lever
Traverse Unit
Service Gear

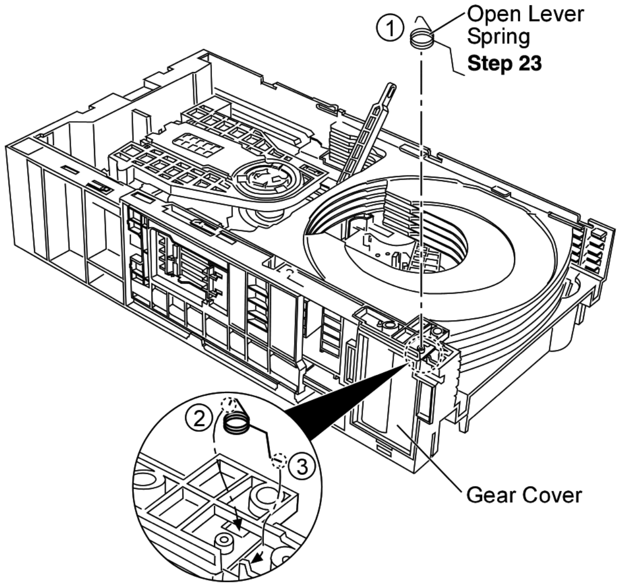
Step 20: Press and hold the plunger lever and rotate the gear clockwise until it stop.


Traverse Unit
Step 21
Service Gear

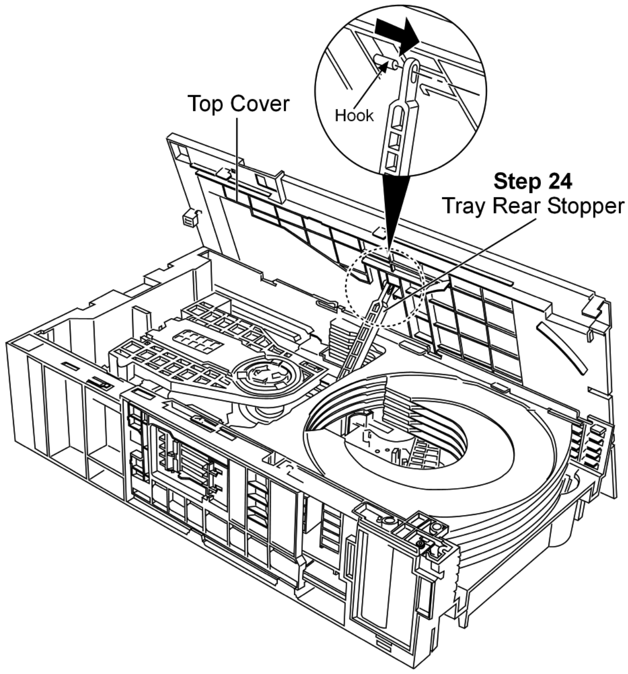
Step 21: Release the plunger lever, rotate the gear clockwise continuously until it stop at “HOME” position.


Mechanism Base
Guide
Claw
③
Home Position
Step 22
Trigger Slide Plate
①
Mechanism Chassis
②
Trigger Gear

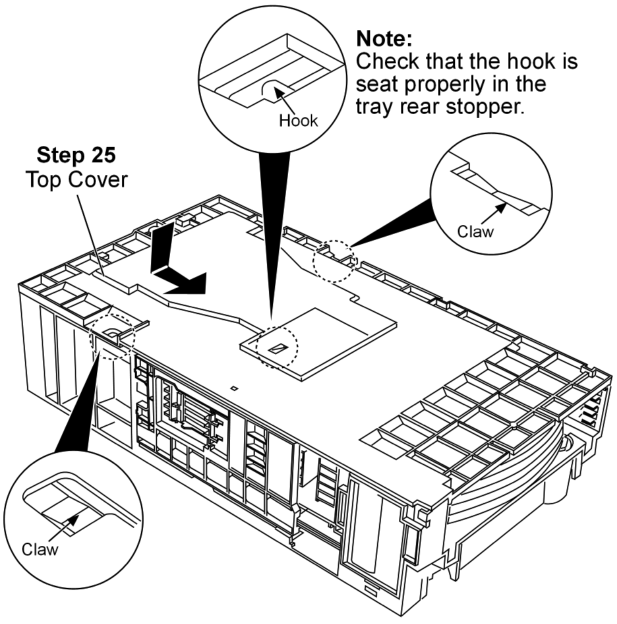
Step 22: Install the trigger slide plate as arrows shown in sequence.


①
Open Lever Spring
Step 23
②
③
Gear Cover

Step 23: Install the open lever spring as shown.


Top Cover
Hook
Step 24
Tray Rear Stopper

Step 24: Install the top cover, fix the top cover hook to the tray rear stopper as arrow shown.

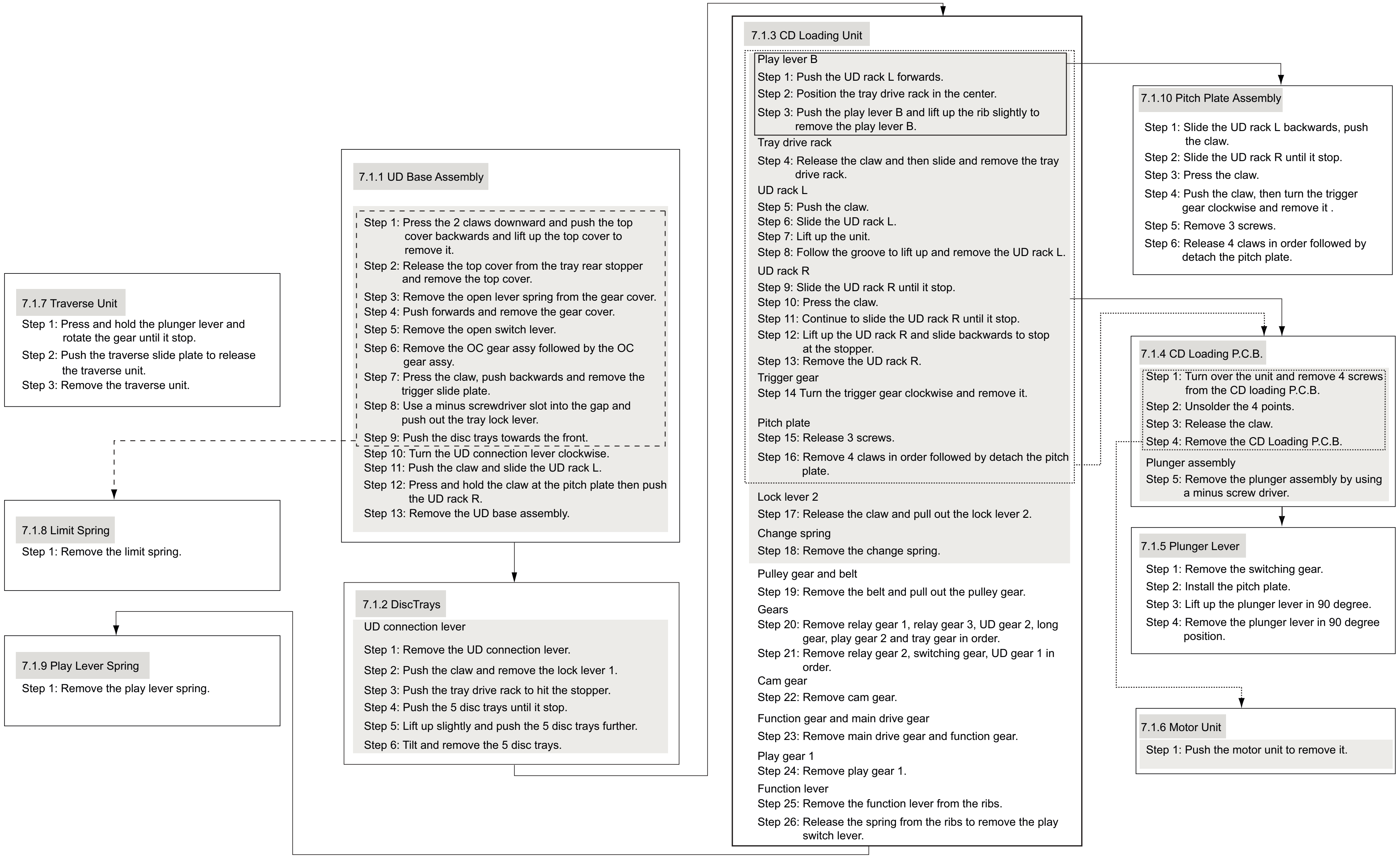

Note:
Check that the hook is seat properly in the tray rear stopper.
Hook
Step 25
Top Cover
Claw
Claw

Step 25: Fix the top cover as arrow shown, the 2 claws should be latched.

6 Flow Chart

6.1. Disassembly Flow Chart

The following chart is the procedure for disassembling the casing and inside parts for internal inspection when carrying out the servicing.



7.1.7 Traverse Unit

Step 1: Press and hold the plunger lever and rotate the gear until it stop.
Step 2: Push the traverse slide plate to release the traverse unit.
Step 3: Remove the traverse unit.

7.1.8 Limit Spring

Step 1: Remove the limit spring.

7.1.9 Play Lever Spring

Step 1: Remove the play lever spring.

7.1.1 UD Base Assembly

Step 1: Press the 2 claws downward and push the top cover backwards and lift up the top cover to remove it.
Step 2: Release the top cover from the tray rear stopper and remove the top cover.
Step 3: Remove the open lever spring from the gear cover.
Step 4: Push forwards and remove the gear cover.
Step 5: Remove the open switch lever.
Step 6: Remove the OC gear assy followed by the OC gear assy.
Step 7: Press the claw, push backwards and remove the trigger slide plate.
Step 8: Use a minus screwdriver slot into the gap and push out the tray lock lever.
Step 9: Push the disc trays towards the front.
Step 10: Turn the UD connection lever clockwise.
Step 11: Push the claw and slide the UD rack L.
Step 12: Press and hold the claw at the pitch plate then push the UD rack R.
Step 13: Remove the UD base assembly.

7.1.2 DiscTrays

UD connection lever
Step 1: Remove the UD connection lever.
Step 2: Push the claw and remove the lock lever 1.
Step 3: Push the tray drive rack to hit the stopper.
Step 4: Push the 5 disc trays until it stop.
Step 5: Lift up slightly and push the 5 disc trays further.
Step 6: Tilt and remove the 5 disc trays.

7.1.3 CD Loading Unit

Play lever B
Step 1: Push the UD rack L forwards.
Step 2: Position the tray drive rack in the center.
Step 3: Push the play lever B and lift up the rib slightly to remove the play lever B.
Tray drive rack
Step 4: Release the claw and then slide and remove the tray drive rack.
UD rack L
Step 5: Push the claw.
Step 6: Slide the UD rack L.
Step 7: Lift up the unit.
Step 8: Follow the groove to lift up and remove the UD rack L.
UD rack R
Step 9: Slide the UD rack R until it stop.
Step 10: Press the claw.
Step 11: Continue to slide the UD rack R until it stop.
Step 12: Lift up the UD rack R and slide backwards to stop at the stopper.
Step 13: Remove the UD rack R.
Trigger gear
Step 14 Turn the trigger gear clockwise and remove it.

Pitch plate
Step 15: Release 3 screws.
Step 16: Remove 4 claws in order followed by detach the pitch plate.
Lock lever 2
Step 17: Release the claw and pull out the lock lever 2.
Change spring
Step 18: Remove the change spring.
Pulley gear and belt
Step 19: Remove the belt and pull out the pulley gear.
Gears
Step 20: Remove relay gear 1, relay gear 3, UD gear 2, long gear, play gear 2 and tray gear in order.
Step 21: Remove relay gear 2, switching gear, UD gear 1 in order.
Cam gear
Step 22: Remove cam gear.
Function gear and main drive gear
Step 23: Remove main drive gear and function gear.
Play gear 1
Step 24: Remove play gear 1.
Function lever
Step 25: Remove the function lever from the ribs.
Step 26: Release the spring from the ribs to remove the play switch lever.

7.1.10 Pitch Plate Assembly

Step 1: Slide the UD rack L backwards, push the claw.
Step 2: Slide the UD rack R until it stop.
Step 3: Press the claw.
Step 4: Push the claw, then turn the trigger gear clockwise and remove it .
Step 5: Remove 3 screws.
Step 6: Release 4 claws in order followed by detach the pitch plate.

7.1.4 CD Loading P.C.B.

Step 1: Turn over the unit and remove 4 screws from the CD loading P.C.B.
Step 2: Unsolder the 4 points.
Step 3: Release the claw.
Step 4: Remove the CD Loading P.C.B.
Plunger assembly
Step 5: Remove the plunger assembly by using a minus screw driver.

7.1.5 Plunger Lever

Step 1: Remove the switching gear.
Step 2: Install the pitch plate.
Step 3: Lift up the plunger lever in 90 degree.
Step 4: Remove the plunger lever in 90 degree position.

7.1.6 Motor Unit

Step 1: Push the motor unit to remove it.

6.2. Assembly Flow Chart

The following chart is the procedure for assembling the casing and inside parts for internal inspection when carrying out the servicing.

7.2.1 CD Loading Unit

Plunger lever
Step 1: Turn over the unit and install the plunger lever in 90 degree position.
Step 2: Push in the plunger lever.
Step 3: Turn over the unit and install the motor unit properly.

Plunger assembly
Step 4: Install the plunger assembly.

CD loading P.C.B.
Step 5: Install the CD Loading P.C.B.
Step 6: The claws should be latched.
Step 7: Solder the 4 points.
Step 8: Fix it with 4 screws.

Play switch lever
Step 9: Install the play switch lever.
Step 10: Fix the spring below the rib.

Function lever
Step 11: Install the the function lever.

Play gear 1
Step 12: Install the play gear 1.

Function gear and main drive gear
Step 13: Install the main drive gear.
Step 14: Install the function gear.

Gears
Step 15: Install the relay gear 2, switching gear and UD gear 1 respectively.
Step 16: Install the cam gear.Make sure the big hole is fix at the position (A) at 90 degree.
Step 17: Turn the cam gear anti-clockwise until the big hole stop at position (B).
Step 18: Install the relay gear 1, relay gear 3, UD gear 2, long gear and play gear 2 respectively.
Step 19: Install the tray relay gear.

Pulley gear and belt
Step 20: Install the pulley gear followed by the belt.

Change spring
Step 21: Install the change spring.

Pitch plate
Step 22: Install the lock lever 2 in sequence.
Step 23: Install the pitch plate.
Step 24: The 4 claws should be latched properly.
Step 25: Fix it with 3 screws.

Trigger gear
Step 26: Install the trigger gear in sequence.
Step 27: Use the screwdriver to turn the hole on the UD gear 2 align with the pitch plate hole.

UD rack R
Step 28: Insert the UD rack R.
Step 29: Push the UD rack R.

UD rack L
Step 30: Insert the UD rack L.
Step 31: Push the claw.
Step 32: Pull the UD rack L.

Tray drive rack
Step 33: Install the tray drive rack.

Play lever B
Step 34: Install the play lever B below the rib.

7.2.2 Disc Trays

Step 1: Tilt and fix the 5 disc trays.
Step 2: Push the 5 disc trays until it stop.
Step 3: Push the tray drive rack until it stop.

Lock lever 1
Step 4: Fix the lock lever 1 onto the pitch plate.
Step 5: Press and hold the claw at the pitch plate then push the UD rack R.
Step 6: Push the claw and slide the UD rack L.

UD connection lever
Step 7: Install the UD connection lever.

↓

7.2.3 UD Base Assembly

Step 1: Push the traverse slide plate.
Step 2: Install the UD base assembly.
Step 3: Turn UD connection lever anti-clockwise, the UD base assembly will move downwards.
Step 4: Install the tray lock lever to the mechanism base and push the tray lock lever with a hand to fix it.
Step 5: Push the disc trays back to the unit.

Trigger Slide Plate
Step 6: Install the trigger slide plate, push forwards and push the trigger until locked by the claw.
Step 7: Install the OC gear spring followed by the OC gear assy.
Step 8: Install the open switch lever.
Step 9: Install the gear cover.
Step 10: Install the open lever spring.
Step 11: Install the top cover, fix the top cover hook to the tray rear stopper.
Step 12: Fixed the top cover, the 2 claws should be latched.

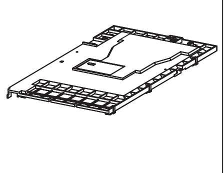
7.2.5 Traverse Unit

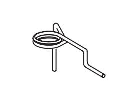
Step 1: Turn over the unit and install traverse unit.
Step 2: Push the traverse slide plate to lock the traverse unit.

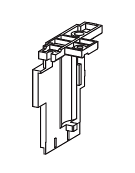
7.2.4 CD Loading P.C.B

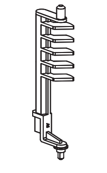
Step 1: Install the plunger assembly.
Step 2: Install the CD Loading P.C.B.
Step 3: The claw should be latched.
Step 4: Fix it with 4 screws.
Step 5: Solder the 4 points.

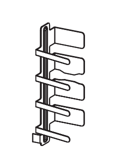
6.3. Disassembly Flow

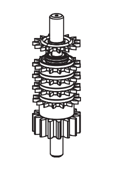

1. Top Cover

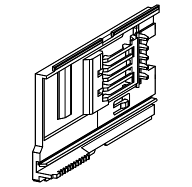

2. Open Lever Spring

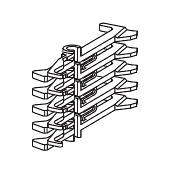

3. Gear Cover

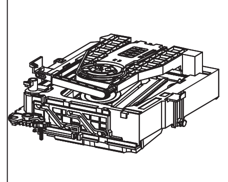

4. Open Switch Lever

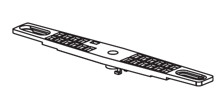

5. OC Gear Spring

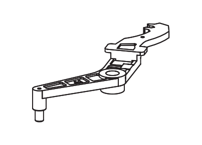

6. OC Gear Assy

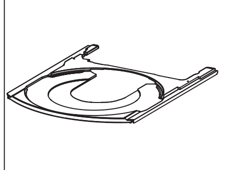

7. Trigger Slide Plate

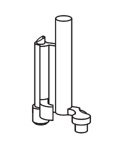

8. Tray Lock Lever

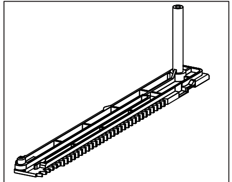

9. UD Base Assy

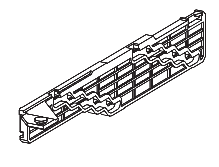

10. UD Connection Lever

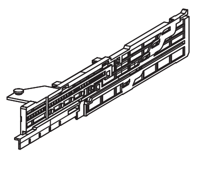

11. Lock Lever 1

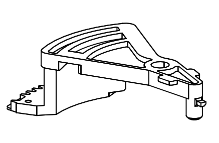

12. Tray

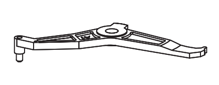

13. Play Lever B

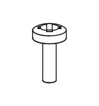

14. Tray Drive Rack

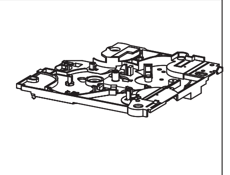

15. UD Rack L

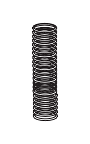

16.UD Rack R

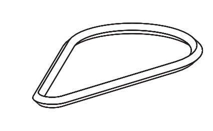

17. Trigger Gear

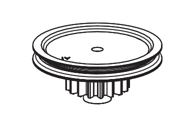

18. Lock Lever 2

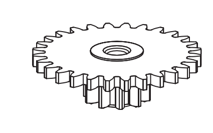

19. Screw

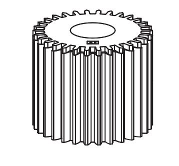

20. Pitch Plate

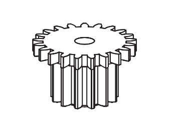

21. Change Spring

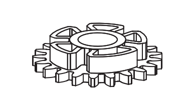

22. Belt

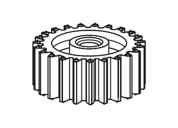

23. Pulley Gear

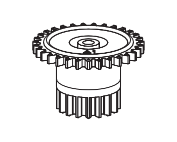

24. Tray Relay Gear

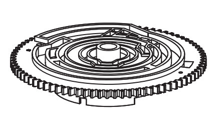

25. Play Gear 2

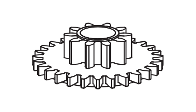

26. Long Gear

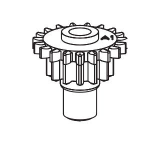

27 UD Gear 2

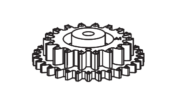

28. Relay Gear 3

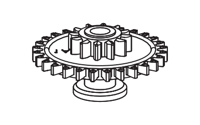

29. Relay Gear 1

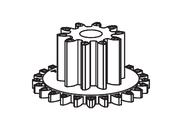

30. Cam Gear

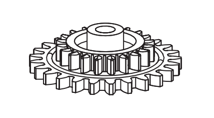

31. UD Gear 1

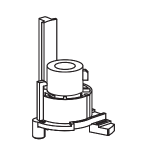

32. Switching Gear

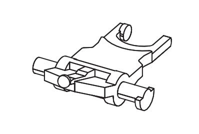

33. Relay Gear 2

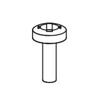

34. Function Gear

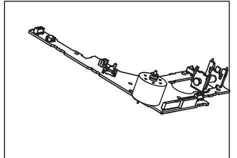

35. Main Drive Gear

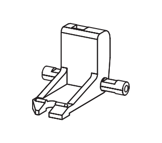

36. Play Gear 1

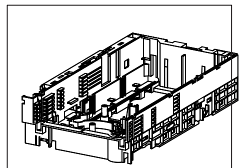

37. Play Switch Lever

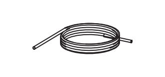

38. Function Lever

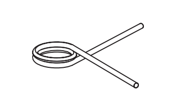

39. Screw


40. CD Loading PCB


41. Plunger Lever


42. Mech Base


43. Play Lever Spring


44. Limit Spring

7 Assembling and Disassembling Procedure.

7.1. Disassembling Procedures

Caution:

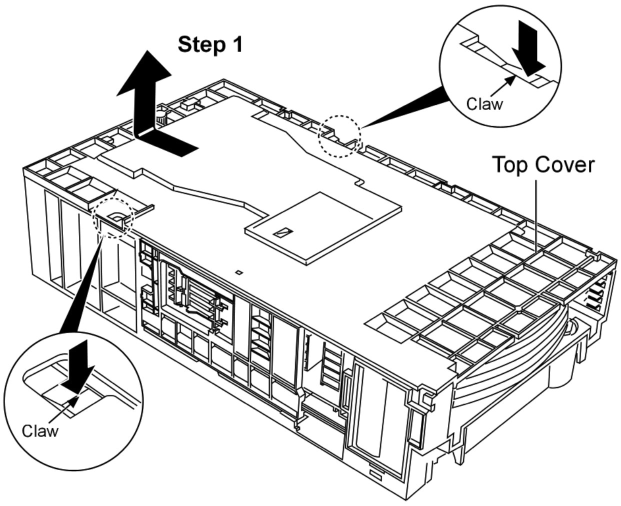
Do ensure that the main unit is set to service mode before repair.

For information on setting to service mode for changer unit, pls refer to section 5.3.

Note:

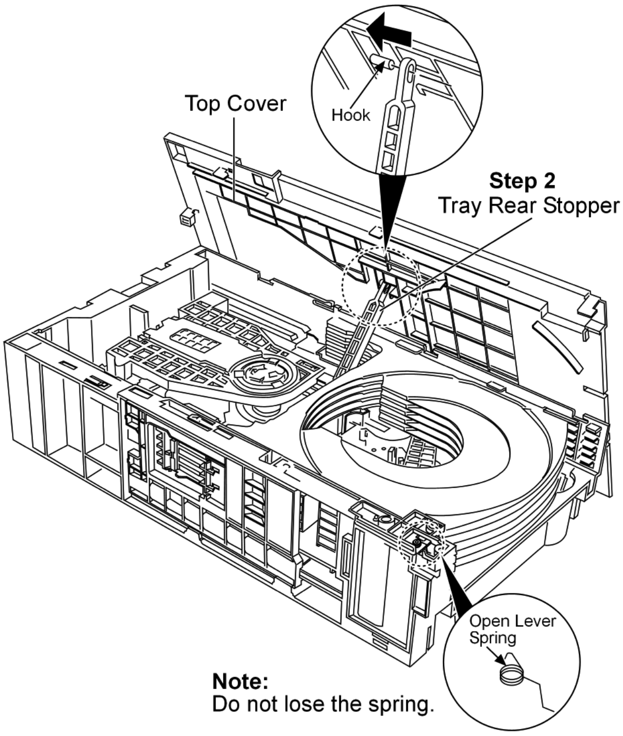
Change unit (CRS1) reliability test must be carry out in complete unit or using the Service P.C.B (Refer section 8).

7.1.1. Disassembly of UD Base Assembly

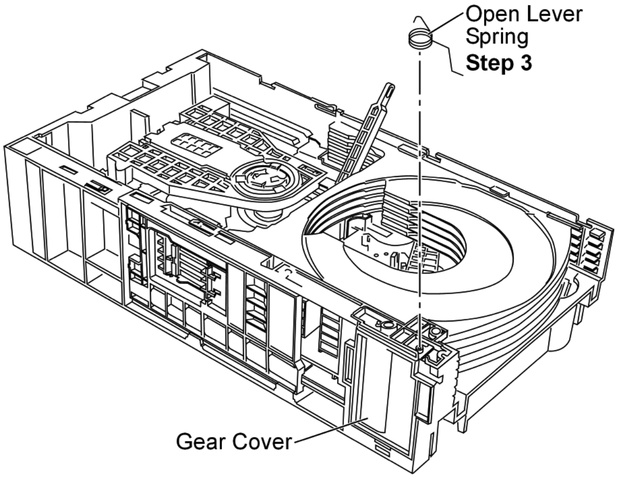

Step 1
Claw
Top Cover
Claw

Step 1: Press the 2 claws downwards and push the top cover backwards and lift up the top cover to remove it.

Caution: Do not exert strong force on the claws when pressing the claws.

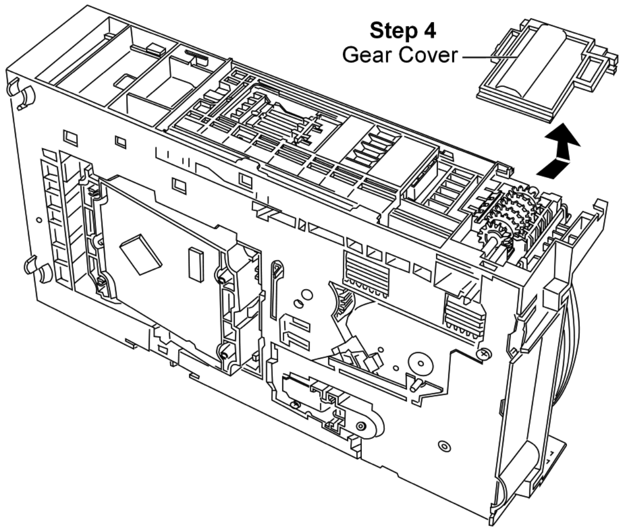

Top Cover
Hook
Step 2
Tray Rear Stopper
Open Lever Spring
Note:
Do not lose the spring.

Step 2: Release the top cover from the tray rear stopper as arrow shown and remove the top cover.

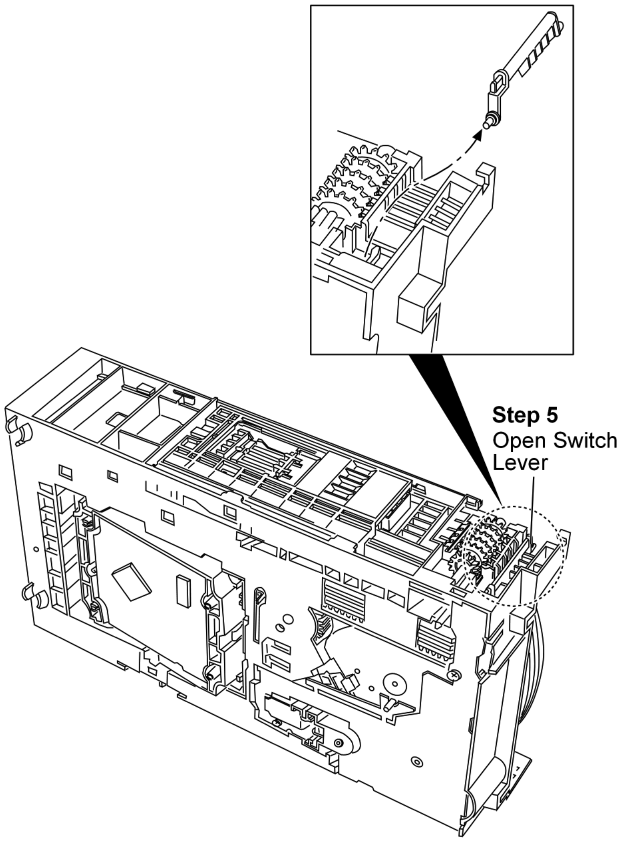

Open Lever Spring
Step 3
Gear Cover

Step 3: Remove the open lever spring from the gear cover.

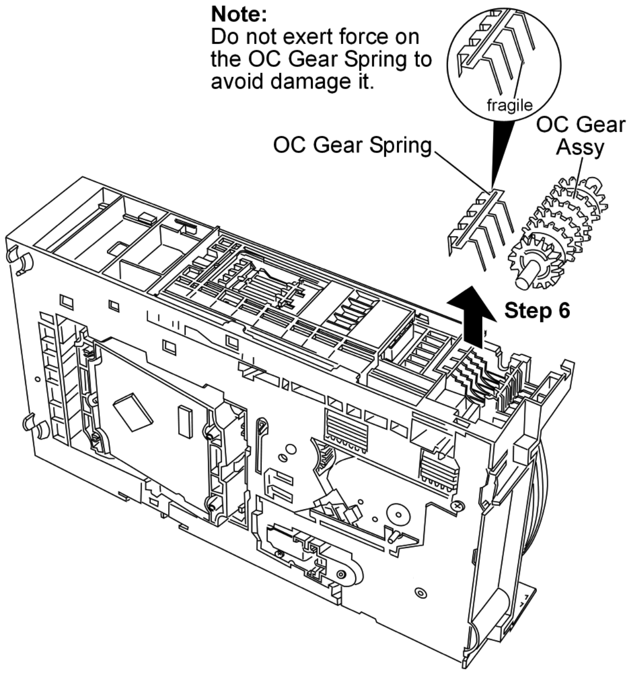
Caution: Ensure the open lever spring is handle properly and keep it in a safe place.


Step 4
Gear Cover

Step 4: Push forwards and remove the gear cover as arrow shown.


Step 5
Open Switch Lever

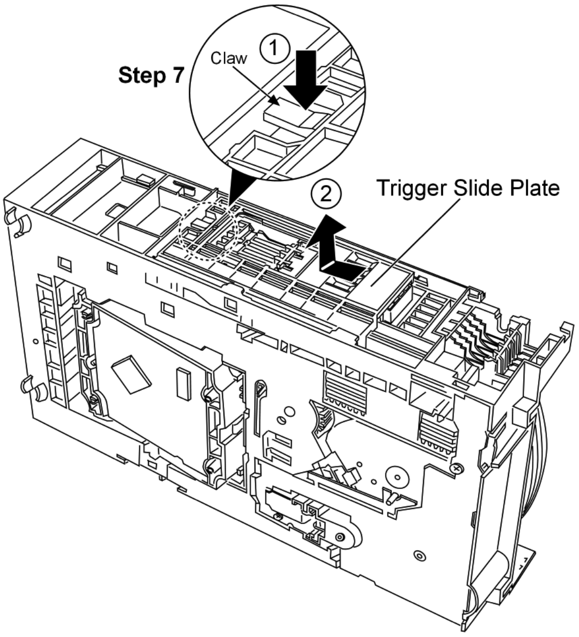
Step 5: Remove the open switch lever.


Note:
Do not exert force on the OC Gear Spring to avoid damage it.

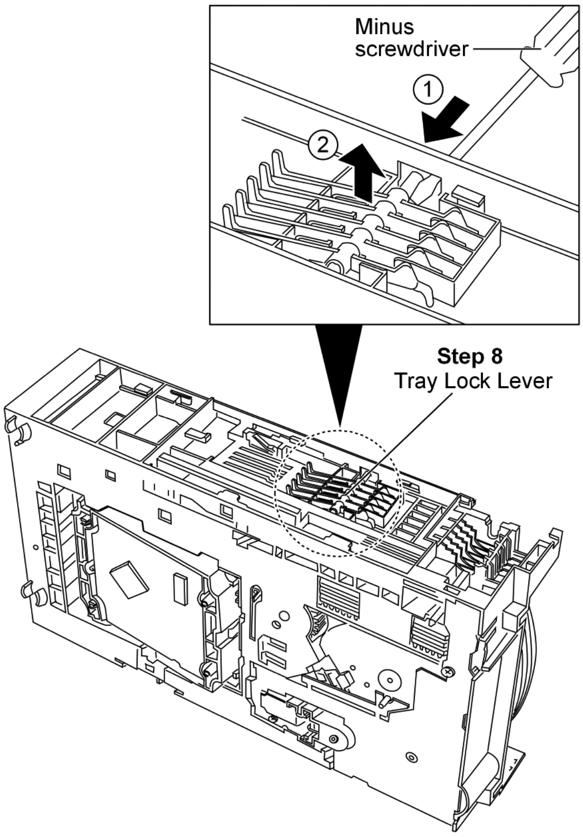
fragile
OC Gear Spring
OC Gear Assy
Step 6

Step 6: Remove the OC gear assy followed by the OC gear spring as arrow shown.

Caution: Ensure the OC gear assy and OC gear spring are handle properly and keep them in a safe place.

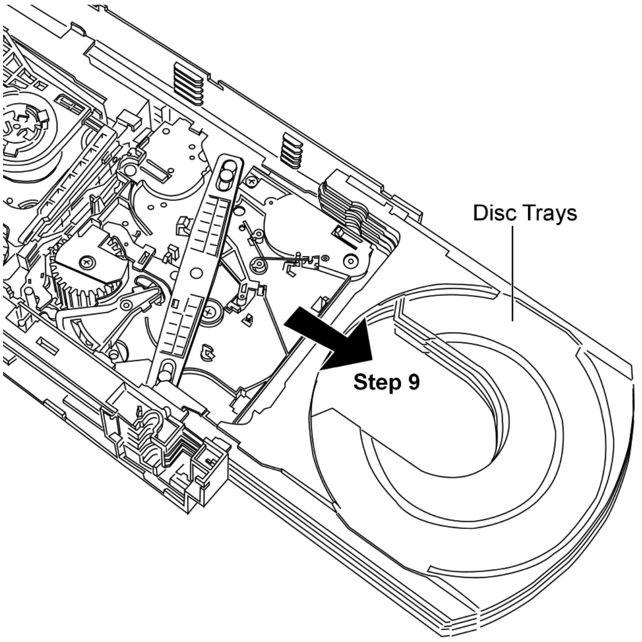

Step 7
Claw
①
②
Trigger Slide Plate

Step 7: Press the claw, push backwards and remove the trigger slide plate as arrows shown.

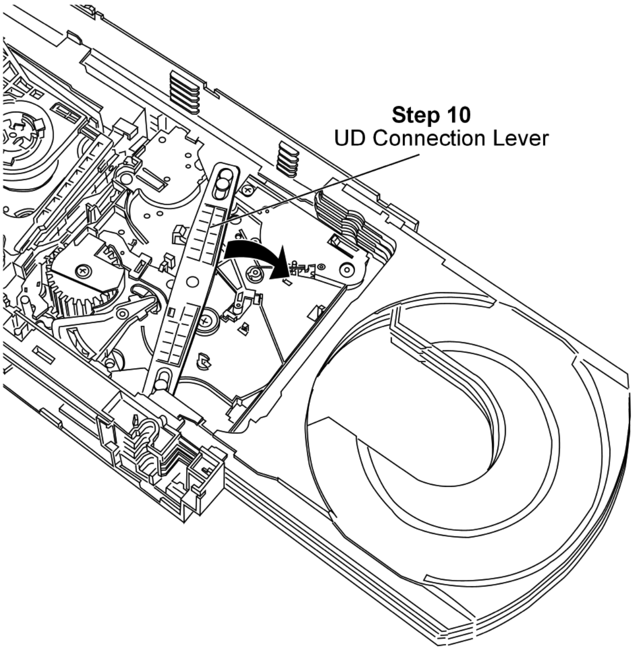

Minus screwdriver
①
②
Step 8
Tray Lock Lever

Step 8: Use a minus screwdriver slot into the gap and push out the tray lock lever as arrows shown.

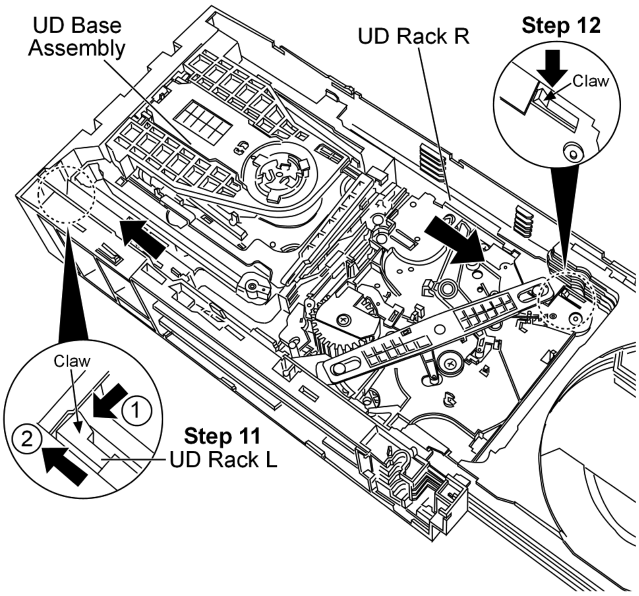
Caution: Do not exert force as it may cause damage to the tray lock lever.


Disc Trays
Step 9

Step 9: Push the disc trays towards the front as arrow shown.

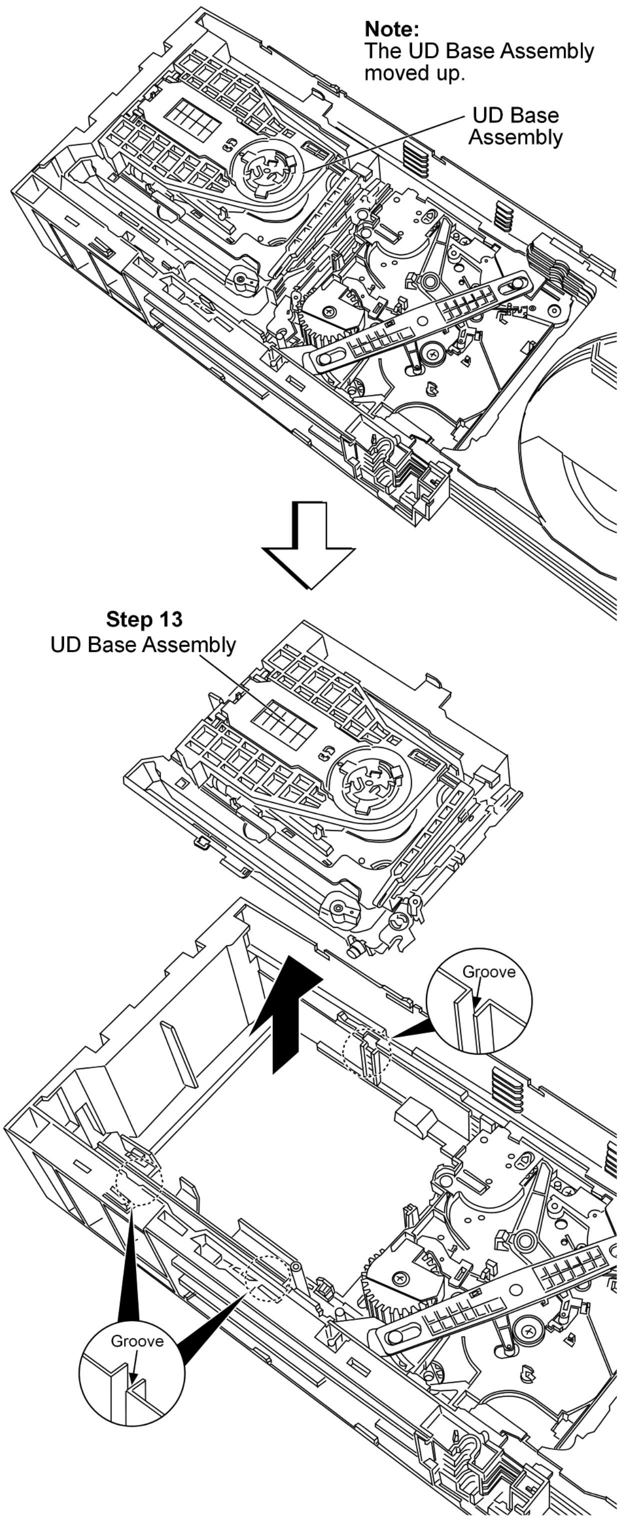

Step 10
UD Connection Lever

Step 10: Turn the UD connection lever clockwise.


UD Base Assembly
UD Rack R
Step 12
Claw
Claw
①
②
Step 11
UD Rack L

Step 11: Push the claw and slide the UD rack L as arrows shown.

Step 12: Press and hold the claw at the pitch plate then push the UD rack R as arrows shown.



Note:
The UD Base Assembly moved up.

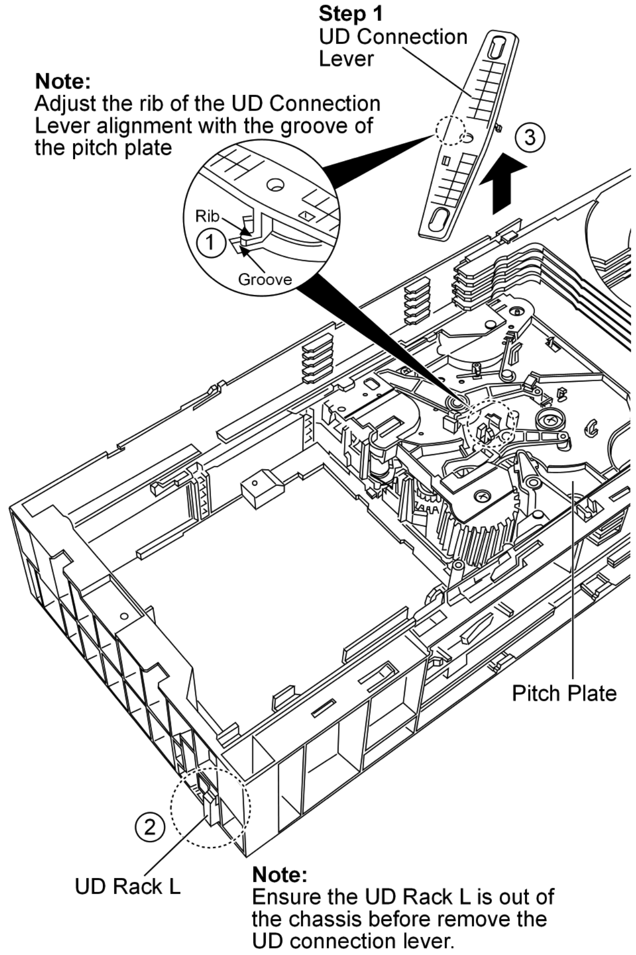
UD Base Assembly
Step 13
UD Base Assembly
Groove
Groove

Step 13: Remove the UD base assembly as arrow shown.

7.1.2. Disassembly of Disc Trays

- Follow the (Step 1) to (Step 13) of item 7.1.1. (Disassembly of UD Base Assembly)

- **Disassembly of UD connection lever**

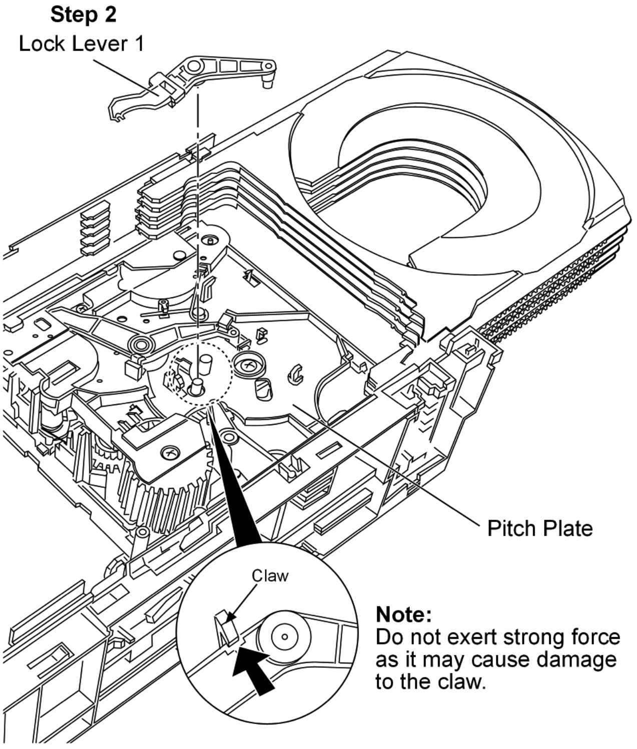


Note:
Adjust the rib of the UD Connection Lever alignment with the groove of the pitch plate

Note:
Ensure the UD Rack L is out of the chassis before remove the UD connection lever.

Step 1
UD Connection Lever
③
Rib
①
Groove
Pitch Plate
②
UD Rack L

Step 1: Remove the UD connection lever.

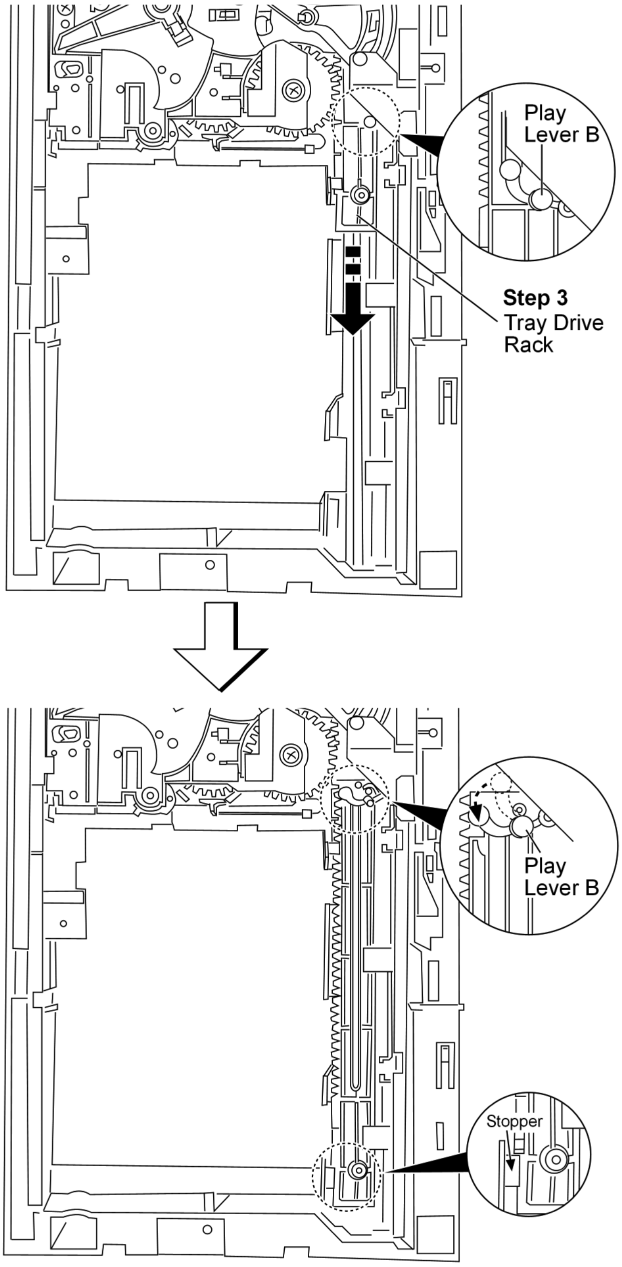


Note:
Do not exert strong force as it may cause damage to the claw.

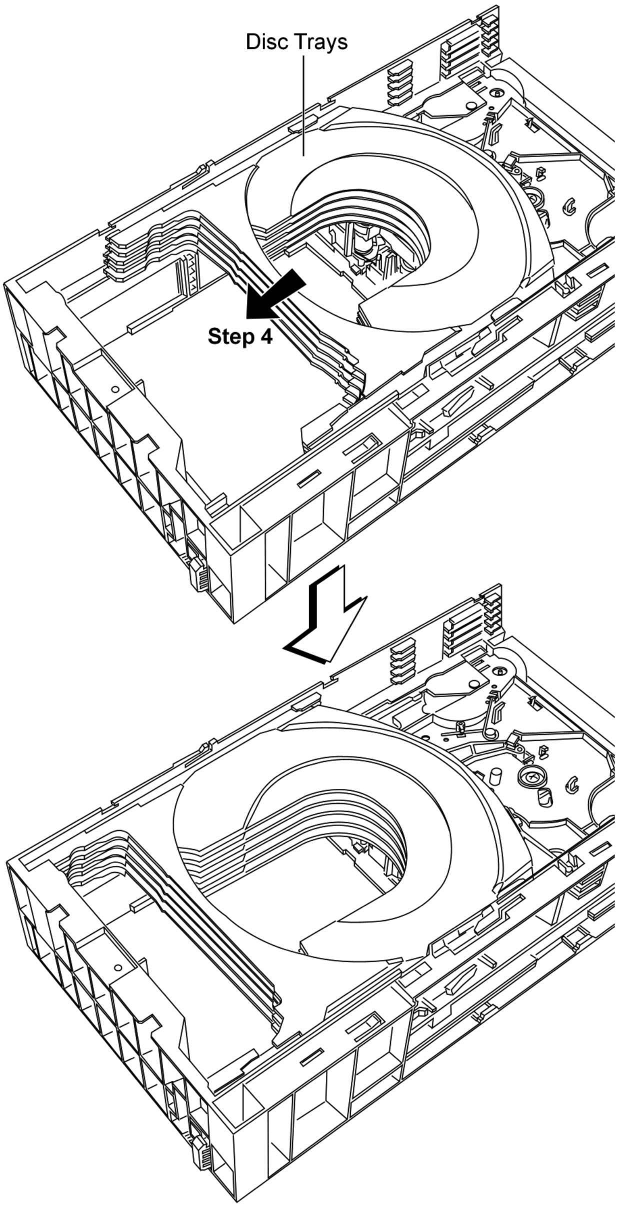
Step 2
Lock Lever 1
Pitch Plate
Claw

Step 2: Push the claw as arrow shown and remove the lock lever 1.

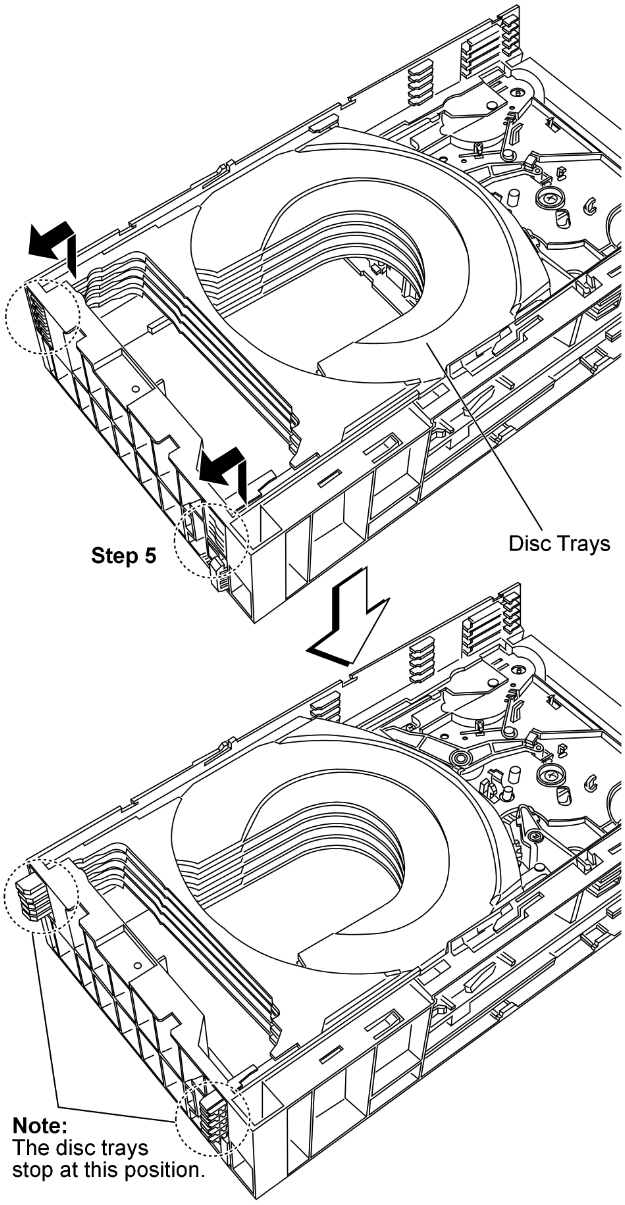
Caution: Do not exert force as it may cause the claw to be damage.


Play
Lever B
Step 3
Tray Drive
Rack
Play
Lever B
Stopper

Step 3: Push the tray drive rack as arrow shown to hit the stopper.

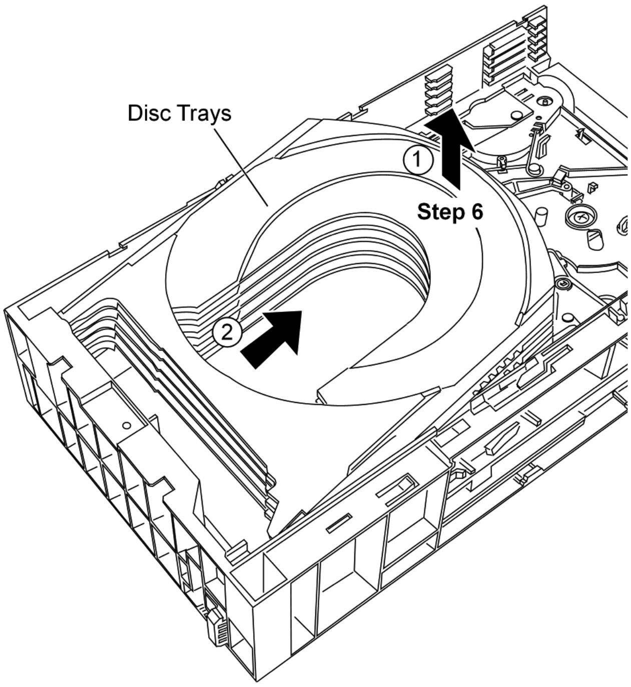

Disc Trays
Step 4

Step 4: Push the 5 disc trays as arrow shown until it stop (bottom picture).



Note:
The disc trays
stop at this position.

Step 5: Lift up slightly and push the 5 disc trays further as arrows shown.

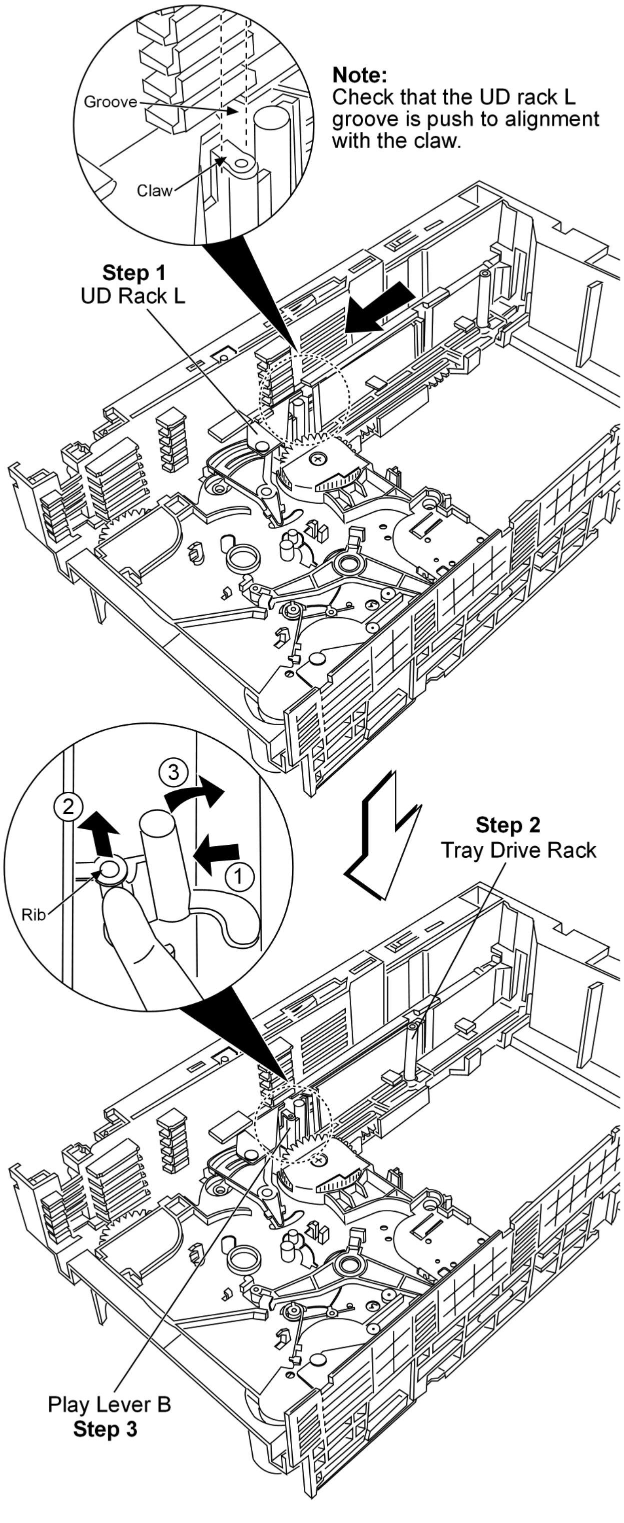


Step 6: Tilt and remove the 5 disc trays as arrows shown.

7.1.3. Disassembly of CD Loading Unit

- Follow the (Step 1) to (Step 13) of item 7.1.1. (Disassembly of UD Base Assembly)
- Follow the (Step 1) to (Step 6) of item 7.1.2. (Disassembly of Disc Trays)

- **Disassembly of play lever B**


Groove
Claw
Step 1
UD Rack L
3
2
1
Rib
Step 2
Tray Drive Rack
Play Lever B
Step 3

Note:
Check that the UD rack L groove is push to alignment with the claw.

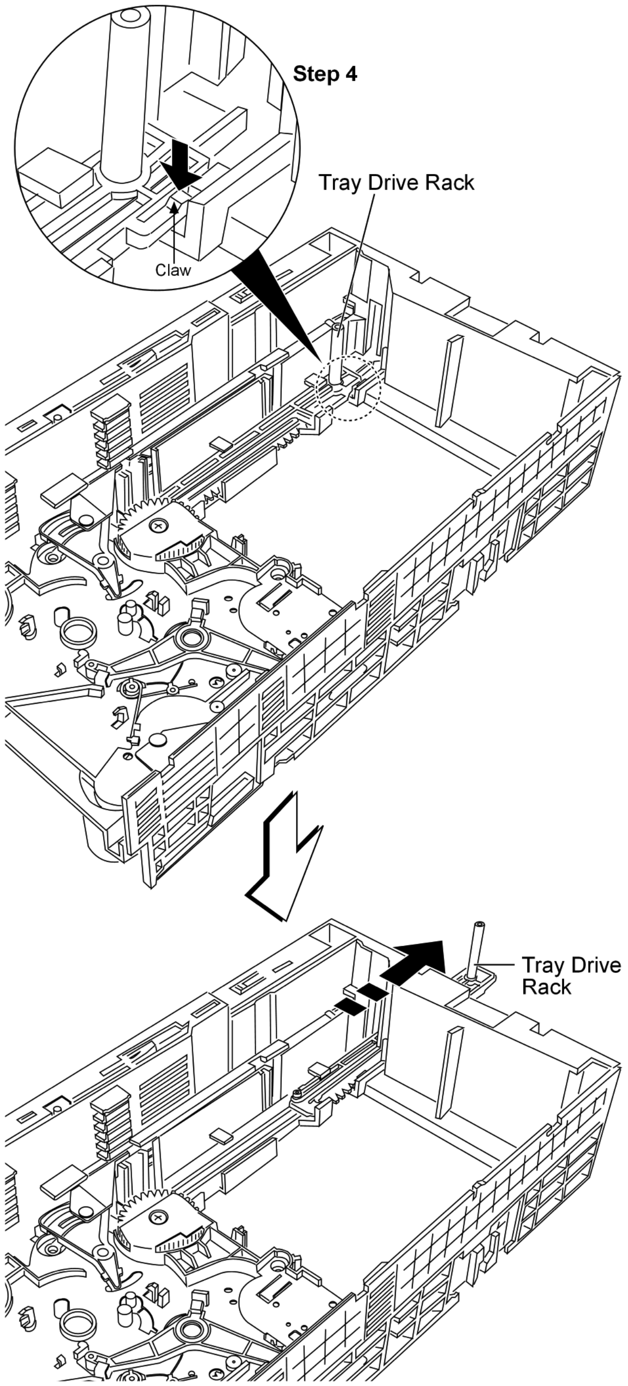
Step 1: Push the UD rack L forwards as arrow shown.

Step 2: Position the tray drive rack in the center.

Step 3: Push the play lever B and lift up the rib slightly to remove the play lever B as arrows shown.

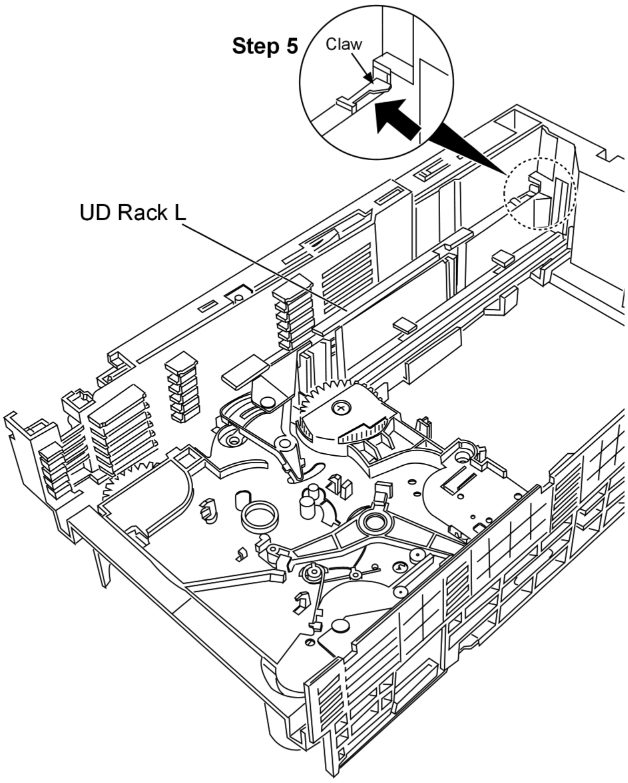
Caution: Make sure do not break the rib when removing the play lever B. The rib break easily by using the tools.

· Disassembly of tray drive rack

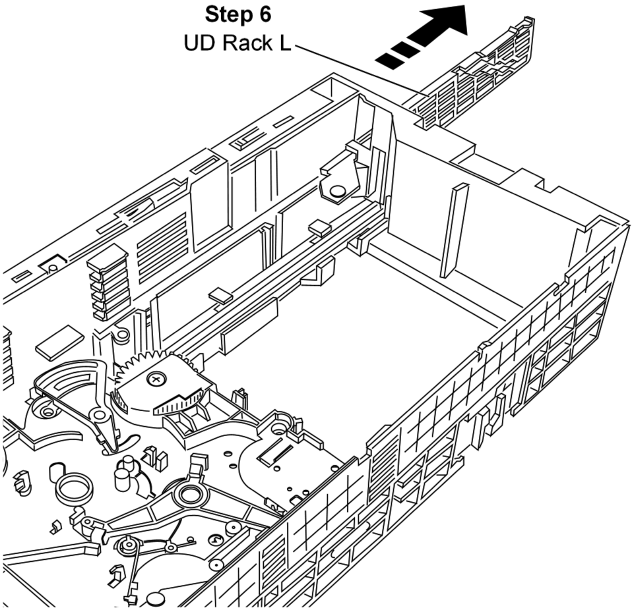

Step 4
Tray Drive Rack
Claw
Tray Drive Rack

Step 4: Release the claw as arrow shown (top picture) then slide and remove the tray drive rack as arrow shown (bottom picture).

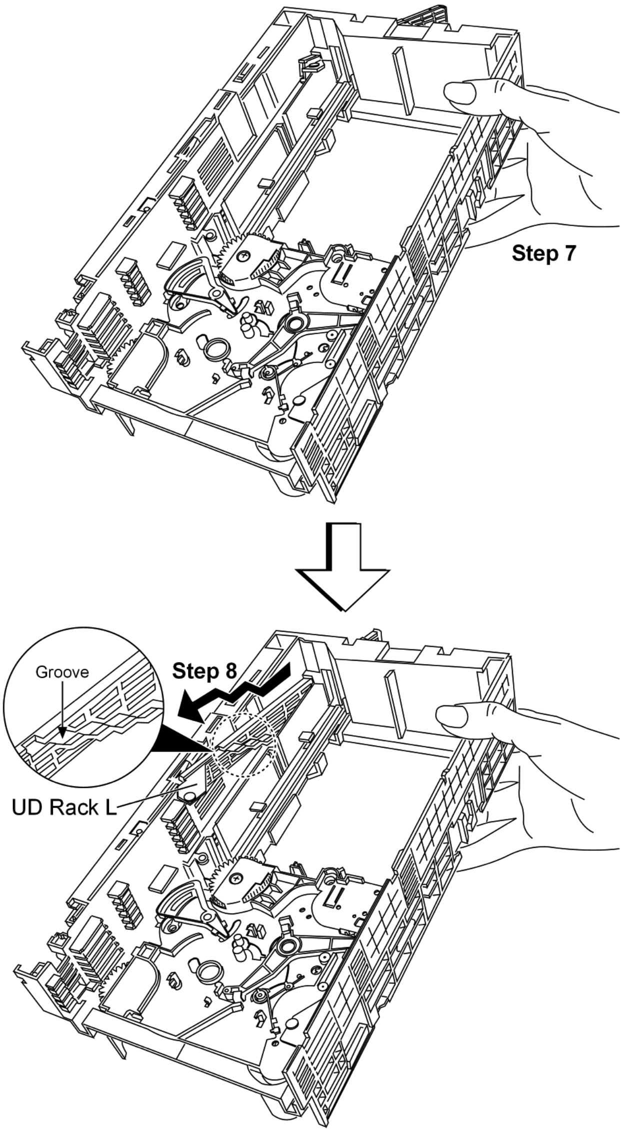
· Disassembly of UD rack L


Step 5
Claw
UD Rack L

Step 5: Push the claw as arrow shown.


Step 6
UD Rack L

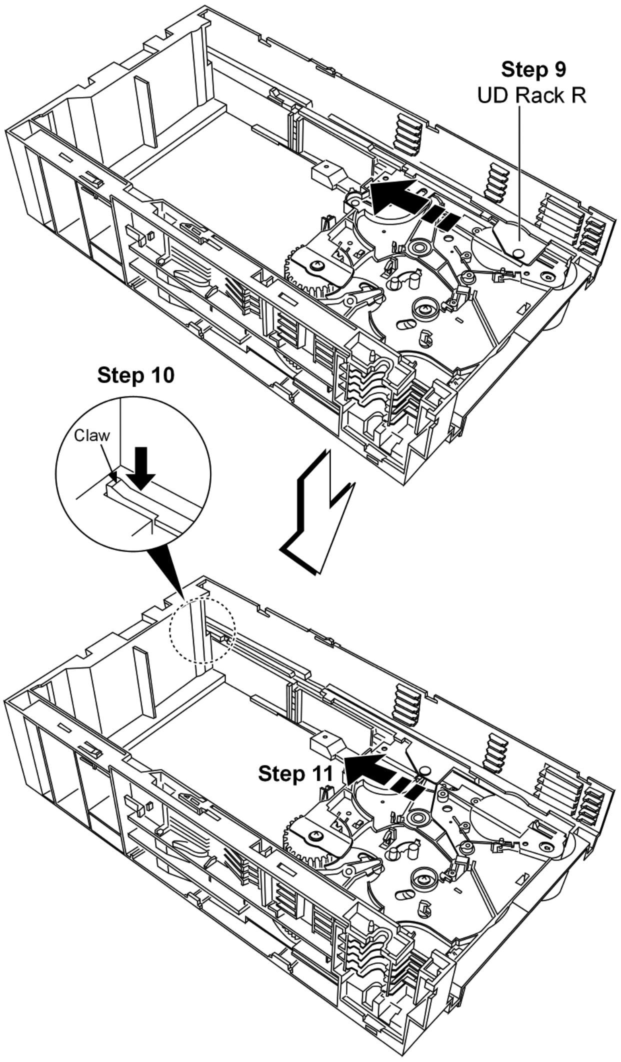
Step 6: Slide the UD rack L as arrow shown.


Step 7
Groove
Step 8
UD Rack L

Step 7: Lift up the unit as shown.

Step 8: Follow the groove to lift up and remove the UD rack L as arrow shown.

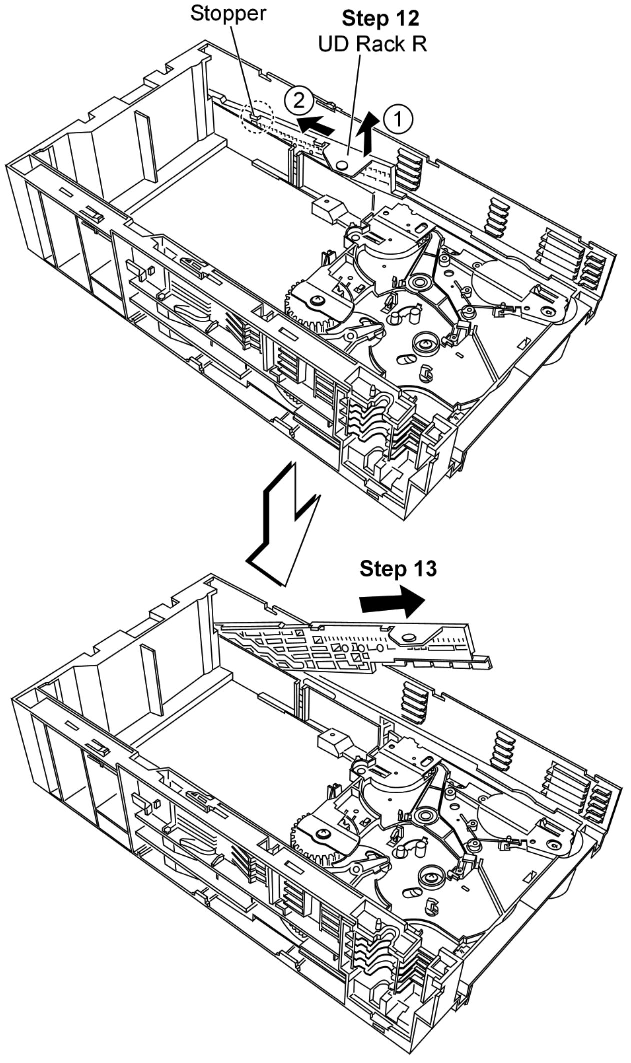
· Disassembly of UD rack R


Step 9
UD Rack R
Step 10
Claw
Step 11

Step 9: Slide the UD rack R as arrow shown until it stop.

Step 10: Press the claw as arrow shown.

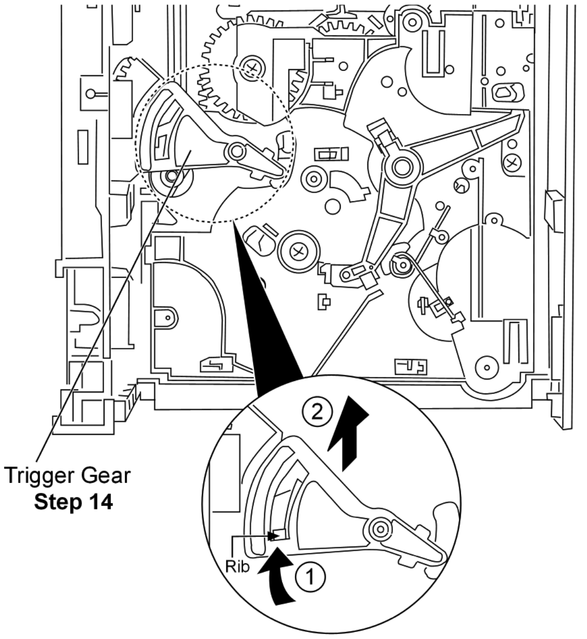
Step 11: Continue to slide the UD rack R as arrow shown until it stop.


Stopper
Step 12
UD Rack R
②
①
Step 13

Step 12: Lift up the UD rack R and slide backwards to stop at the stopper.

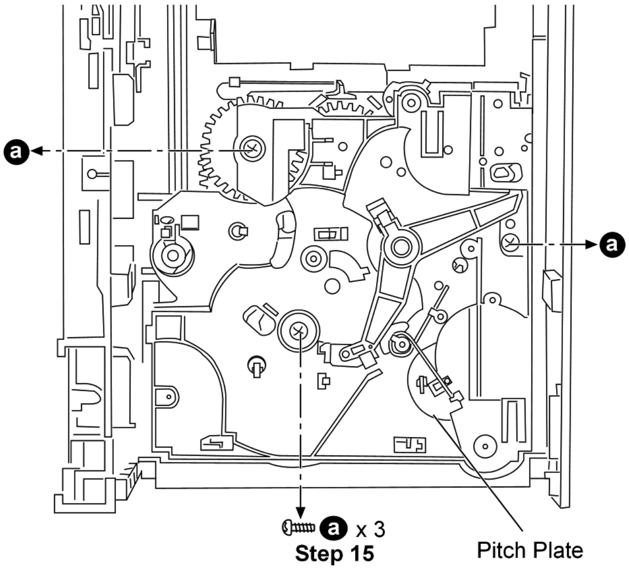
Step 13: Remove it as arrow shown.

- **Disassembly of trigger gear**

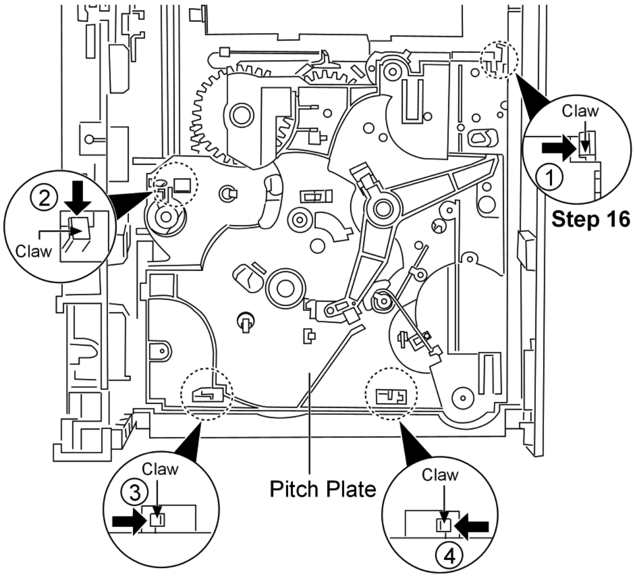

Trigger Gear
Step 14
②
Rib
①

Step 14: Turn the trigger gear clockwise and remove it as arrows shown.

· Disassembly of pitch plate

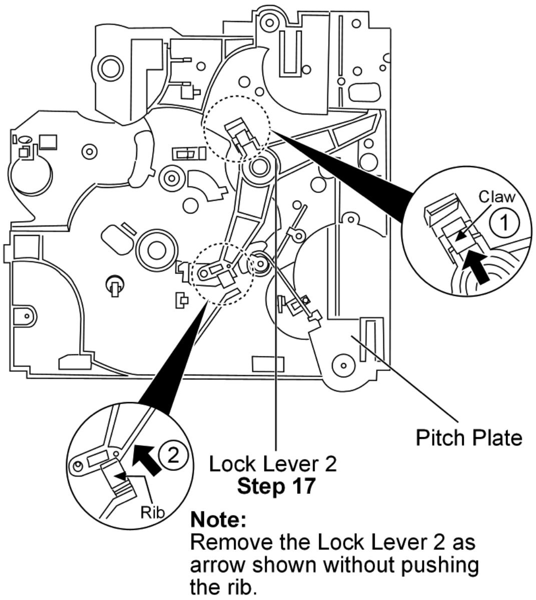

a
a
a x 3
Step 15
Pitch Plate

Step 15: Remove 3 screws


Claw
①
Step 16
②
Claw
Claw
③
Pitch Plate
Claw
④

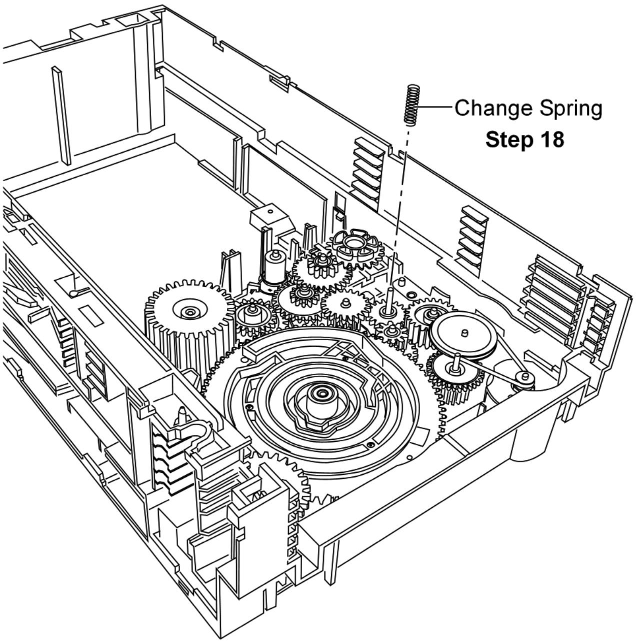
Step 16: Release 4 claws as arrows shown in order followed by detach the pitch plate.

· Disassembly of lock lever 2


Claw
①
②
Rib
Lock Lever 2
Step 17
Pitch Plate
Note:
Remove the Lock Lever 2 as arrow shown without pushing the rib.

Step 17: Release the claw and pull out the lock lever 2 as arrows shown. (The rib is fragile, do not exert force on it).

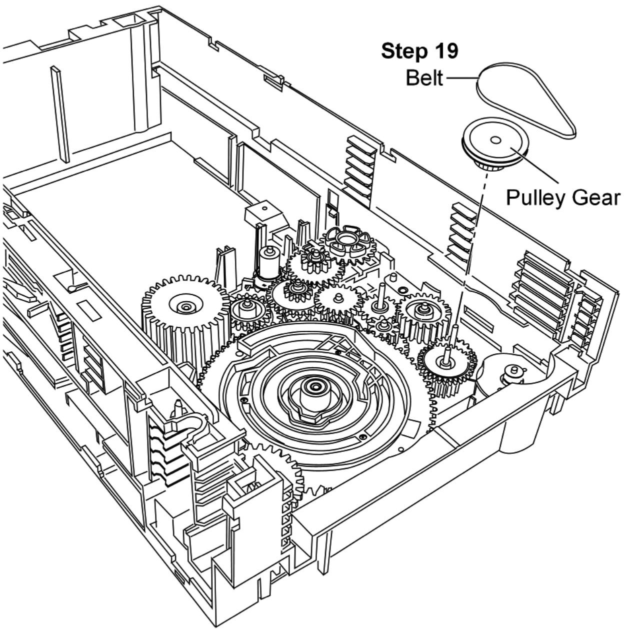
· Disassembly of change spring

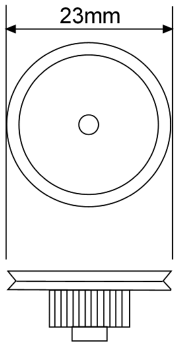

Change Spring
Step 18

Step 18: Remove the change spring.

Caution: Handle the change spring carefully, do not lose it. Put in a proper storage location.

· Disassembly of pulley gear and belt

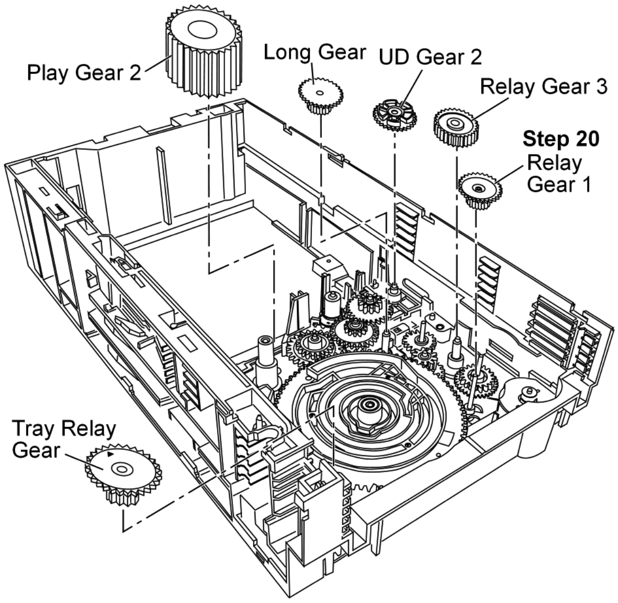

Step 19
Belt
Pulley Gear

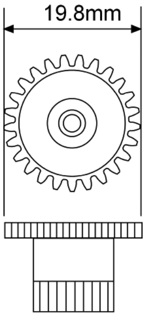


Pulley Gear

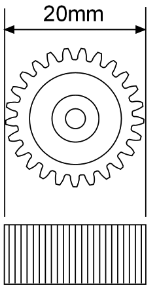
Step 19: Remove the belt and pull out the pulley gear.

· Disassembly of gears

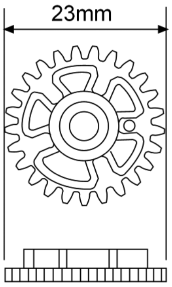

Play Gear 2
Long Gear
UD Gear 2
Relay Gear 3
Step 20
Relay Gear 1
Tray Relay Gear



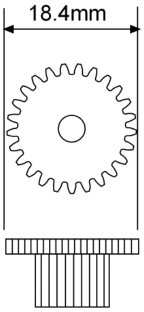
Relay Gear 1



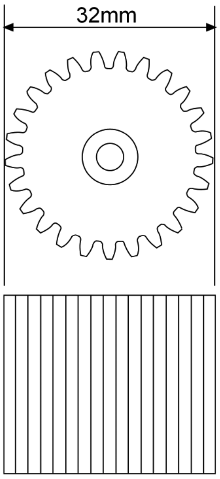
Relay Gear 3



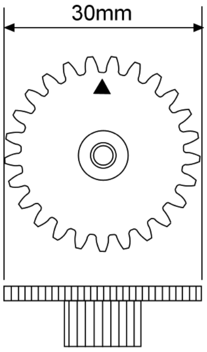
UD Gear 2



Long Gear

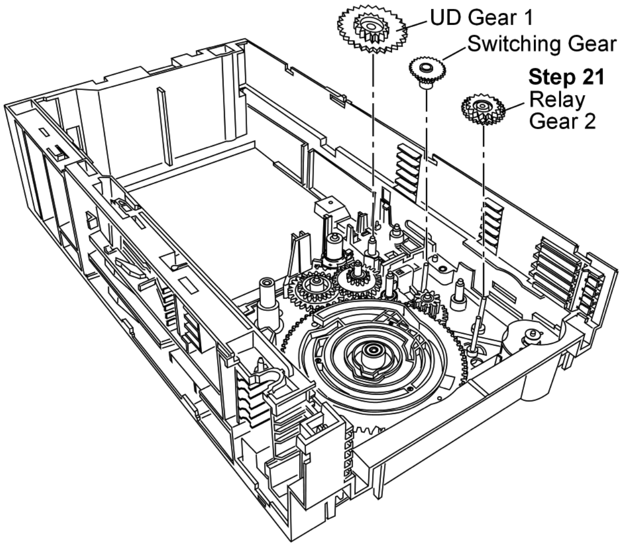


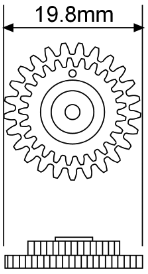
Play Gear 2



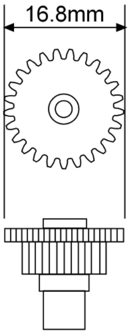
Tray Relay Gear

Step 20: Remove the relay gear 1, relay gear 3, UD gear 2, long gear, play gear 2 and tray relay gear in order.

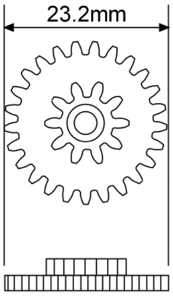

UD Gear 1
Switching Gear
Step 21
Relay Gear 2



Relay Gear 2



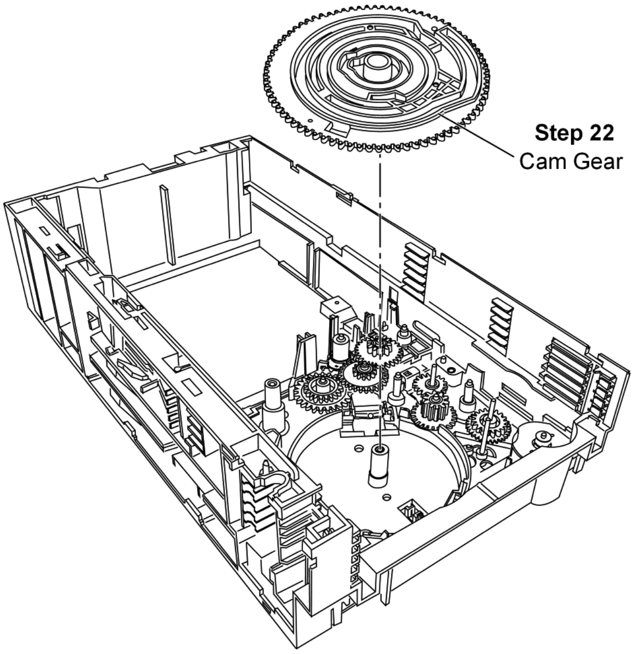
Switching Gear



UD Gear 1

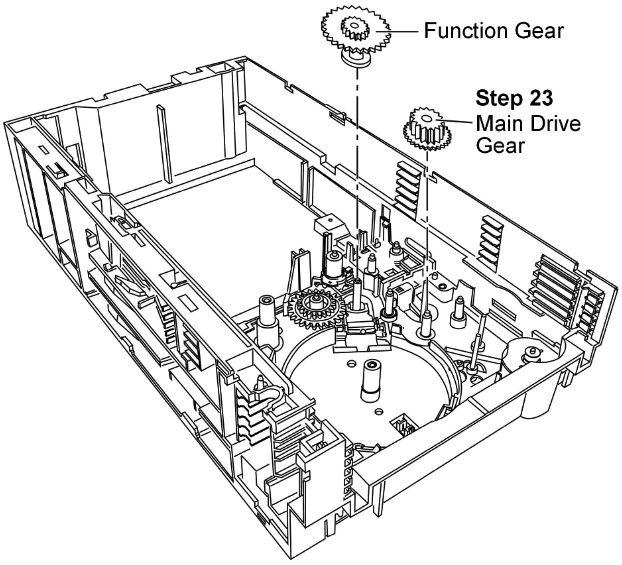
Step 21: Remove relay gear 2, switching gear, UD gear 1 in order.

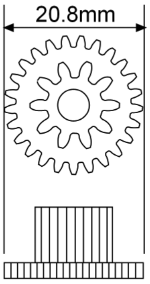
· **Disassembly of cam gear**


Step 22
Cam Gear

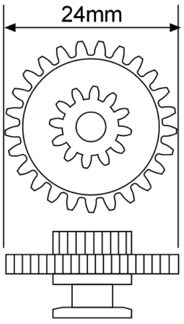
Step 22: Remove cam gear.

· **Disassembly of function gear and main drive gear**


Function Gear
Step 23
Main Drive Gear



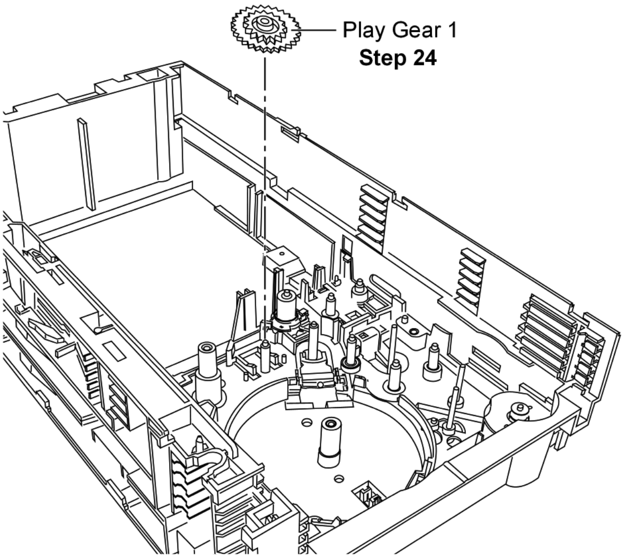
Main Drive Gear

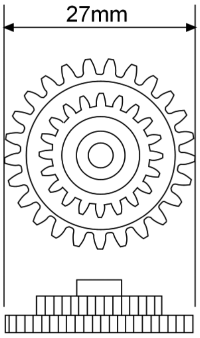


Function Gear

Step 23: Remove main drive gear and function gear.

· Disassembly of play gear 1

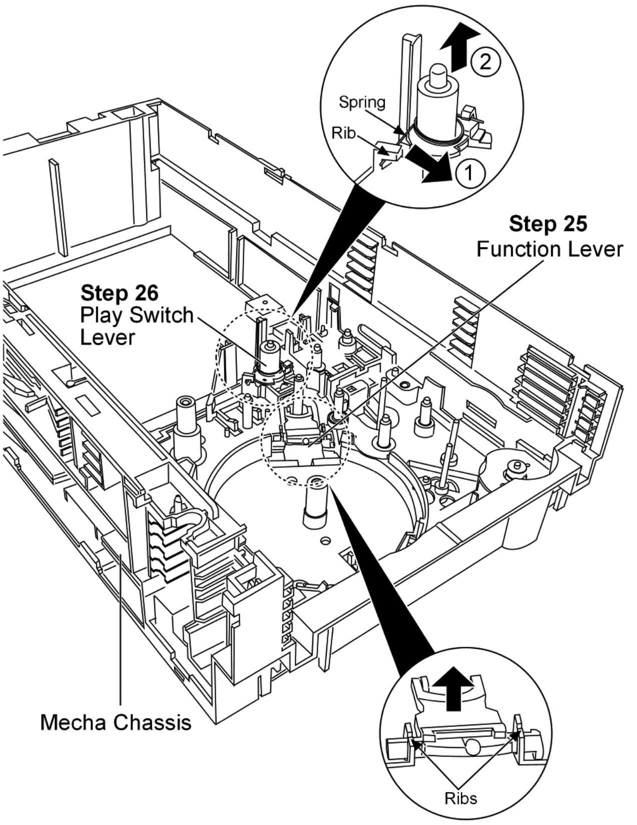

Play Gear 1
Step 24



Play Gear 1

Step 24: Remove play gear 1.

· Disassembly of function lever

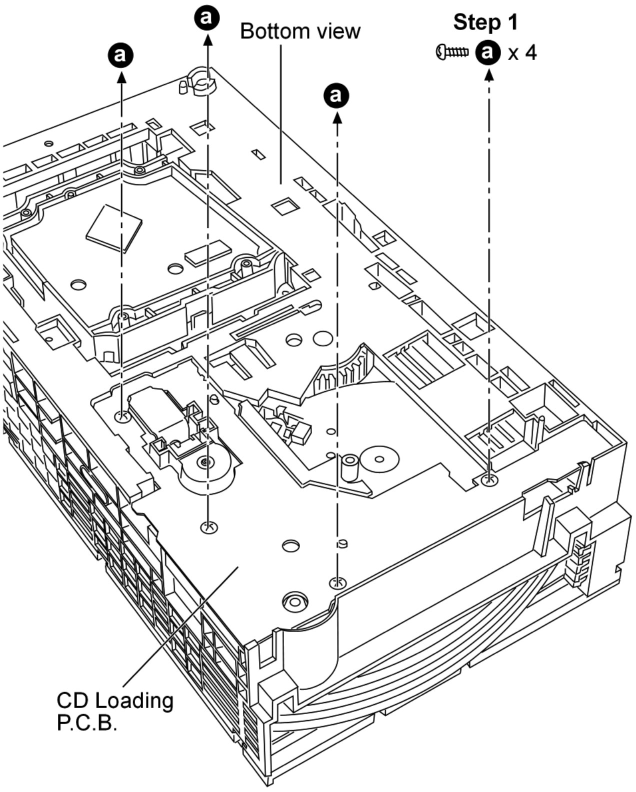

2
Spring
Rib
1
Step 25
Function Lever
Step 26
Play Switch Lever
Mecha Chassis
Ribs

Step 25: Remove the function lever from the ribs as arrow shown.

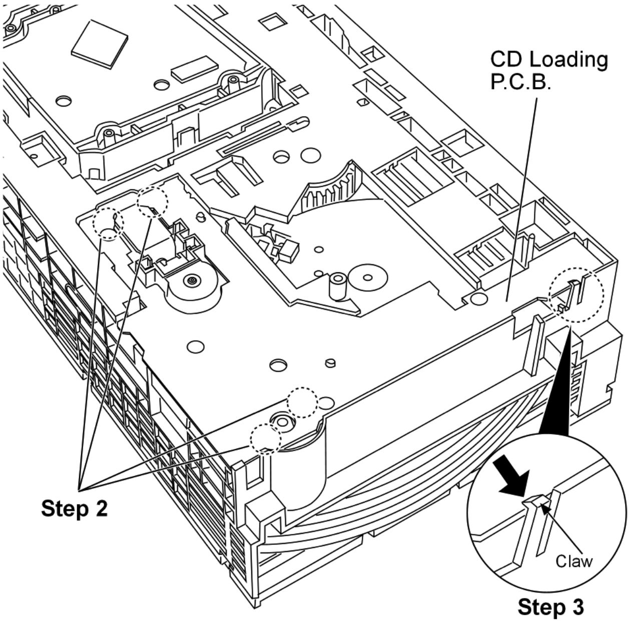
Step 26: Release the spring from the rib as arrow shown to remove the play switch lever.

Note: For changing of the mecha chassis, please follow Step 1 to Step 5 of item 7.1.4 (Disassembly of CD Loading P.C.B.), Step 3 to Step 4 of item 7.1.5 (Disassembly of Plunger Lever) and Step 2 of item 7.1.6 (Disassembly of Motor Unit)

7.1.4. Disassembly of CD Loading P.C.B.

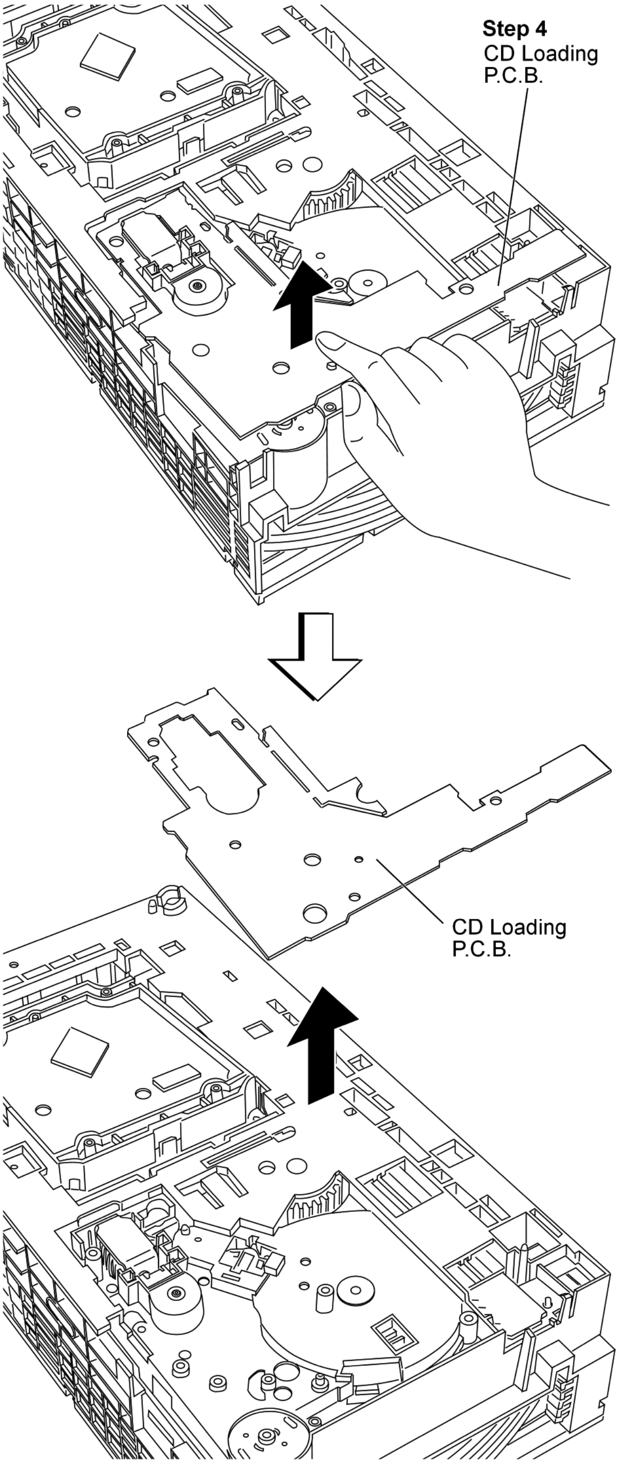

a
a
Bottom view
a
Step 1
a x 4
CD Loading P.C.B.

Step 1: Turn over the unit and remove 4 screws from the CD Loading P.C.B.


CD Loading P.C.B.
Step 2
Claw
Step 3

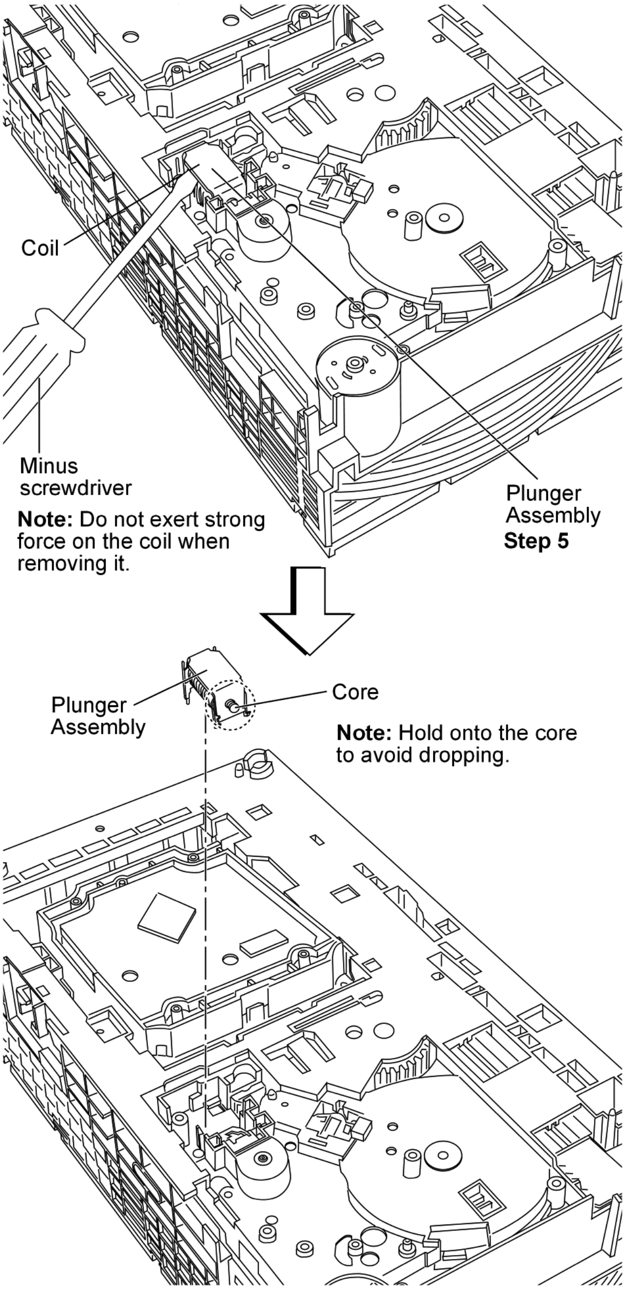
Step 2: Unsolder the 4 points.

Step 3: Release 1 claw as arrow shown.


Step 4
CD Loading P.C.B.
CD Loading P.C.B.

Step 4: Remove the CD Loading P.C.B. as arrows shown.

- **Disassembly of plunger assembly**


Coil
Minus screwdriver
Plunger Assembly
Step 5
Plunger Assembly
Core

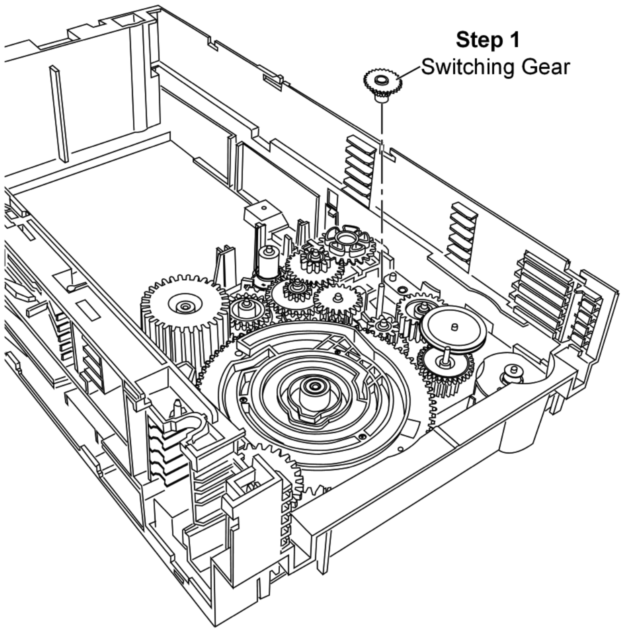
Note: Do not exert strong force on the coil when removing it.

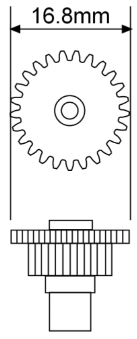
Note: Hold onto the core to avoid dropping.

Step 5: Remove the plunger assembly by using a minus screwdriver.

7.1.5. Disassembly of Plunger Lever

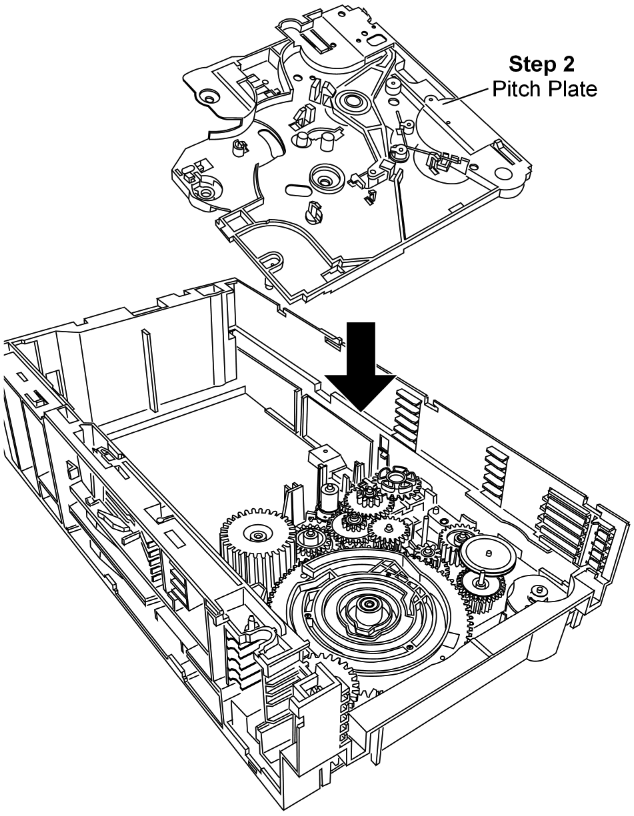
- Follow the (Step 1) to (Step 13) of item 7.1.1. (Disassembly of UD Base Assembly)
- Follow the (Step 1) to (Step 6) of item 7.1.2. (Disassembly of Disc Trays)
- Follow the (Step 1) to (Step 18) of item 7.1.3. (Disassembly of CD Loading Unit)
- Follow the (Step 1) to (Step 5) of item 7.1.4. (Disassembly of CD Loading P.C.B.)


Step 1
Switching Gear



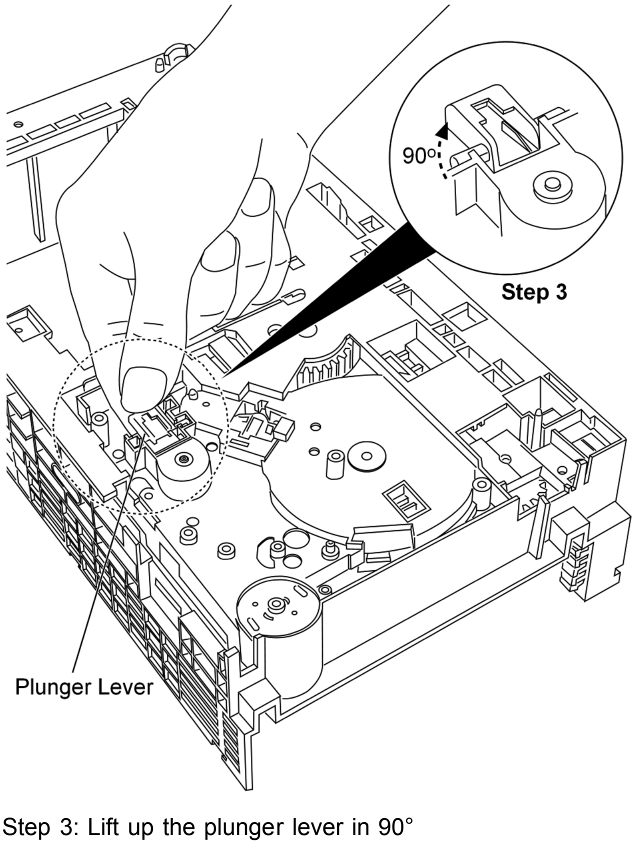
Switching Gear

Step 1: Remove the switching gear.

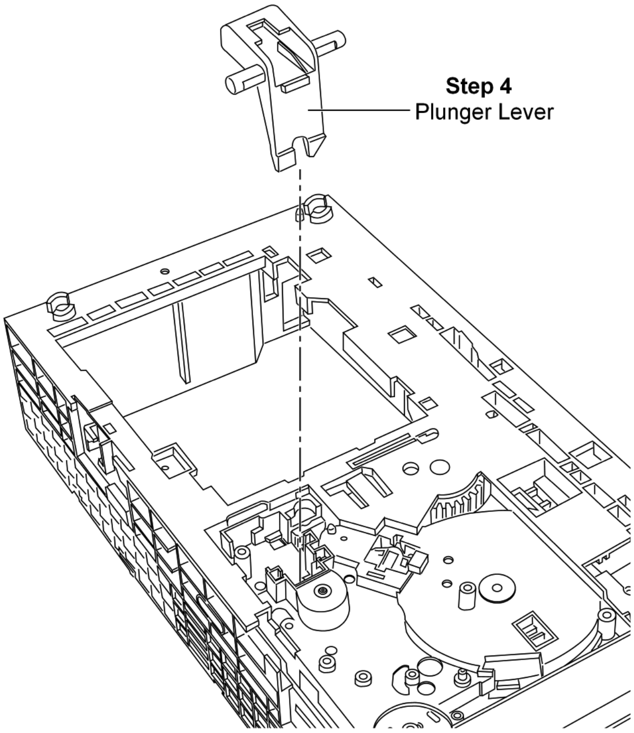

Step 2
Pitch Plate

Step 2: Install the pitch plate.

Note: Ensure the pitch plate seats properly onto it.


90°
Step 3
Plunger Lever

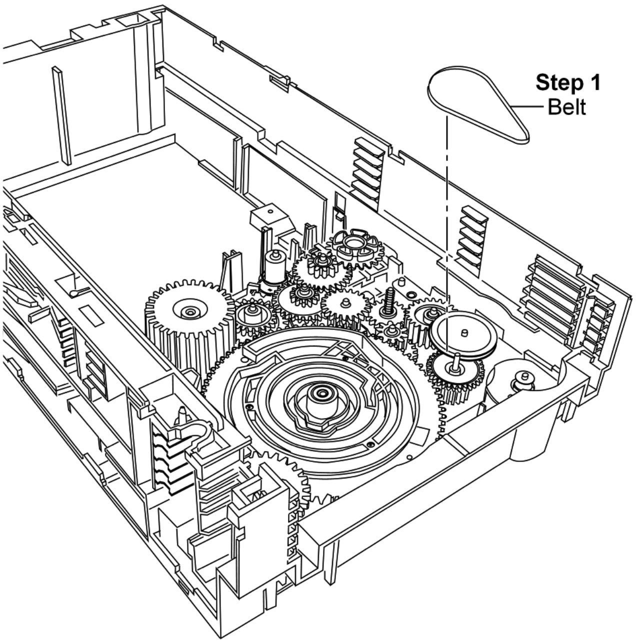
Step 3: Lift up the plunger lever in 90°


Step 4
Plunger Lever

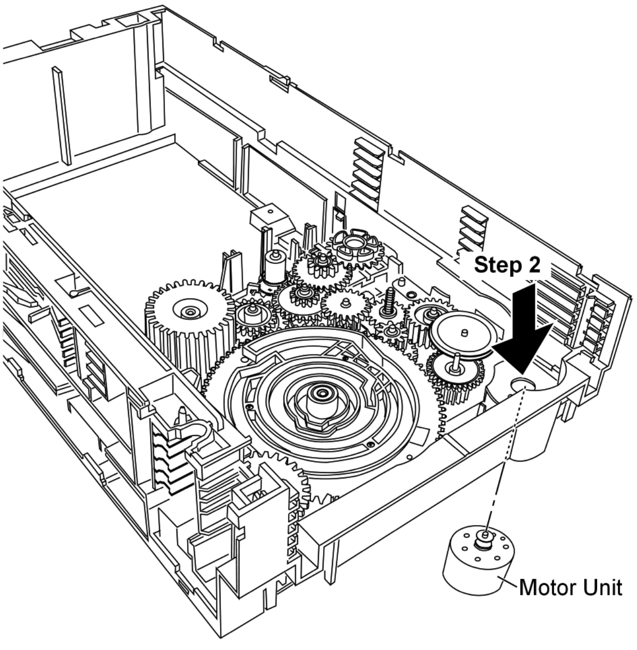
Step 4: Remove the plunger lever in 90° position.

7.1.6. Disassembly of Motor Unit

- Follow the (Step 1) to (Step 13) of item 7.1.1. (Disassembly of UD Base Assembly)
- Follow the (Step 1) to (Step 6) of item 7.1.2. (Disassembly of Disc Trays)
- Follow the (Step 1) to (Step 16) of item 7.1.3. (Disassembly of CD Loading Unit)
- Follow the (Step 1) to (Step 4) of item 7.1.4. (Disassembly of CD Loading P.C.B.)



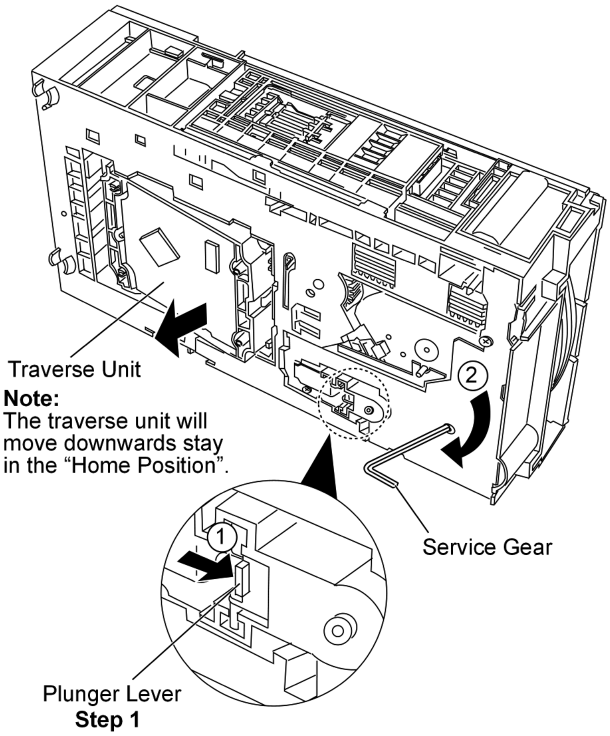
Step 1: Remove the belt.


Step 2
Motor Unit

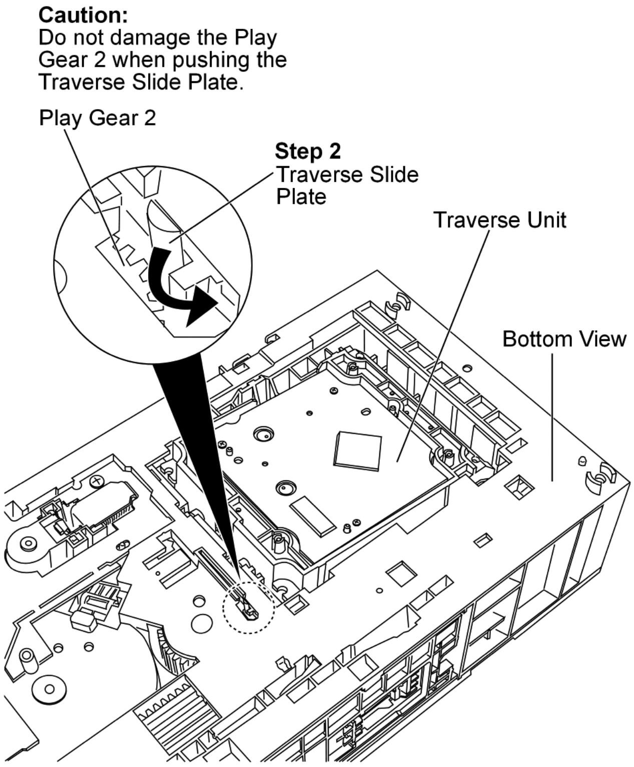
Step 2: Push the motor unit as arrow show to remove it.

7.1.7. Disassembly of Traverse Unit

Important notes: Ensure all the trays are in the "STOCK" position before proceeding to the disassemble of traverse unit. For procedures to set the trays in "STOCK" position, please refer to (5. Troubleshooting Explorer)

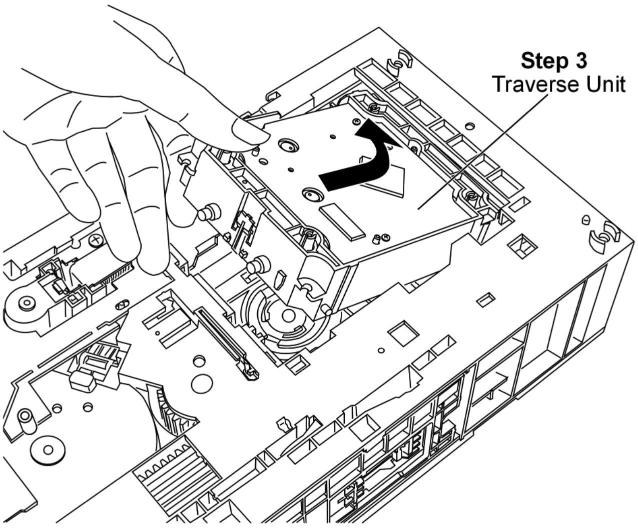

Traverse Unit
Note:
The traverse unit will move downwards stay in the "Home Position".
②
①
Service Gear
Plunger Lever
Step 1

Step 1: Press and hold the plunger lever and rotate the gear as arrows shown until it stop.


Caution:
Do not damage the Play Gear 2 when pushing the Traverse Slide Plate.
Play Gear 2
Step 2
Traverse Slide Plate
Traverse Unit
Bottom View

Step 2: Push the traverse slide plate as arrow shown to release the traverse unit.

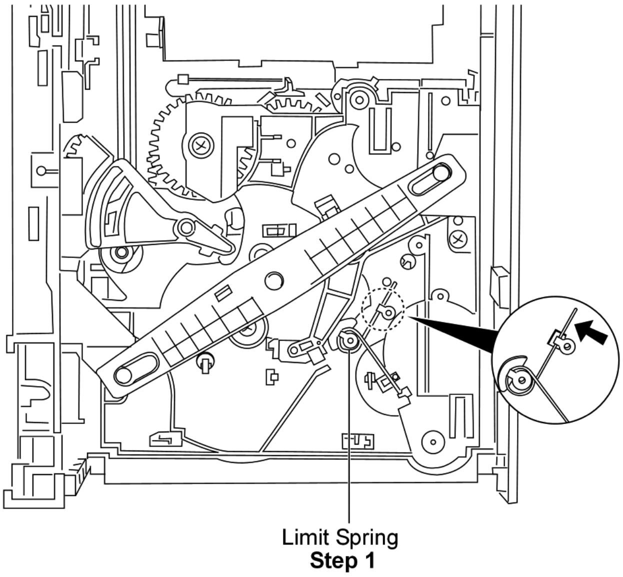
Caution: Do not exert strong force on the traverse slide plate.


Step 3
Traverse Unit

Step 3: Remove the traverse unit as arrow shown.

7.1.8. Disassembly of Limit Spring

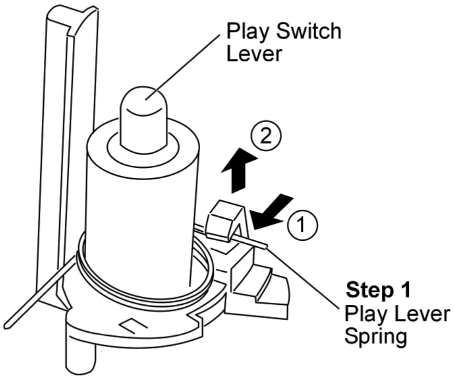
- Follow the (Step 1) to (Step 9) of item 7.1.1. (Disassembly of UD Base Assembly)


Limit Spring
Step 1

Step 1: Remove the limit spring as arrow shown.

7.1.9. Disassembly of Play Lever Spring

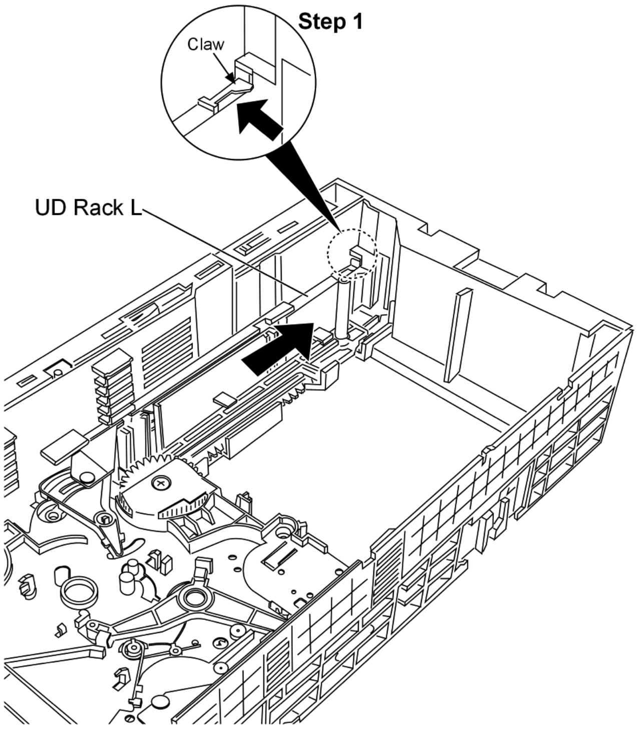
- Follow the (Step 1) to (Step 13) of item 7.1.1. (Disassembly of UD Base Assembly)
- Follow the (Step 1) to (Step 6) of item 7.1.2. (Disassembly of Disc Trays)
- Follow the (Step 1) to (Step 26) of item 7.1.3. (Disassembly of CD Loading Unit)


Play Switch Lever
②
①
Step 1
Play Lever Spring

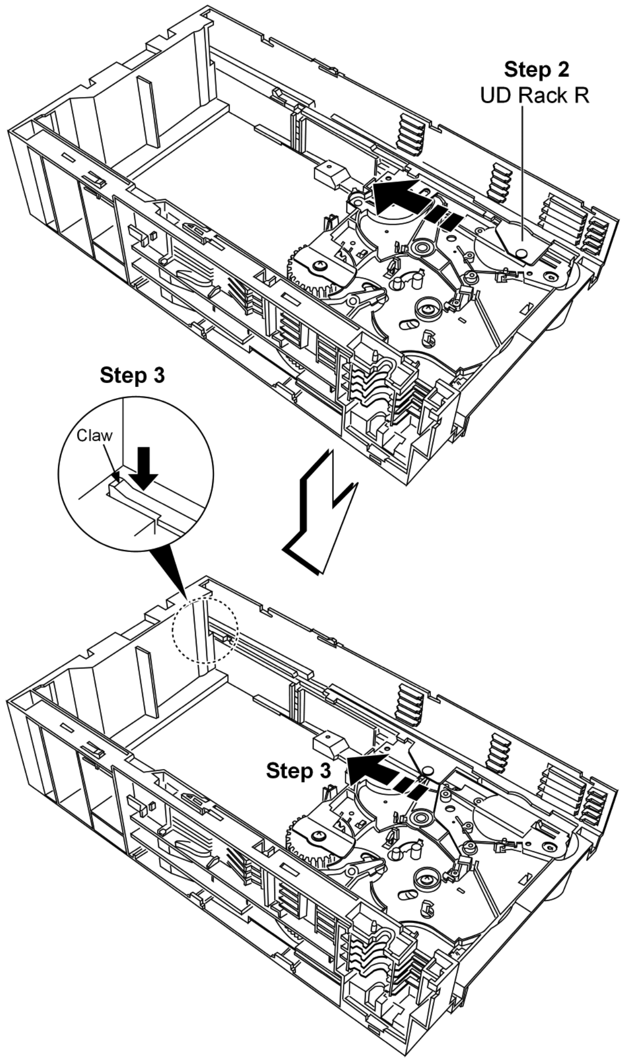
Step 1: Remove the play lever spring as arrow shown.

7.1.10. Disassembly of Pitch Plate Assembly

- Follow the (Step 1) to (Step 13) of item 7.1.1. (Disassembly of UD Base Assembly)
- Follow the (Step 1) to (Step 6) of item 7.1.2. (Disassembly of Disc Trays)
- Follow the (Step 1) to (Step 3) of item 7.1.3. (Disassembly of CD Loading Unit)

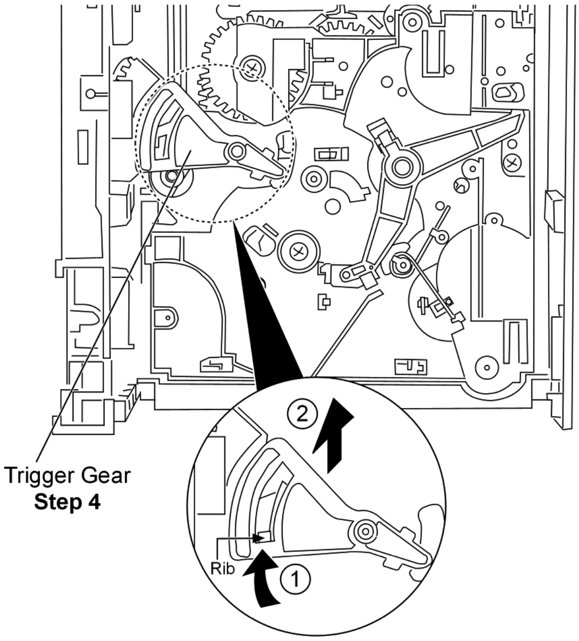

Step 1
Claw
UD Rack L

Step 1: Slide the UD rack L backwards, push the claw as arrow shown.

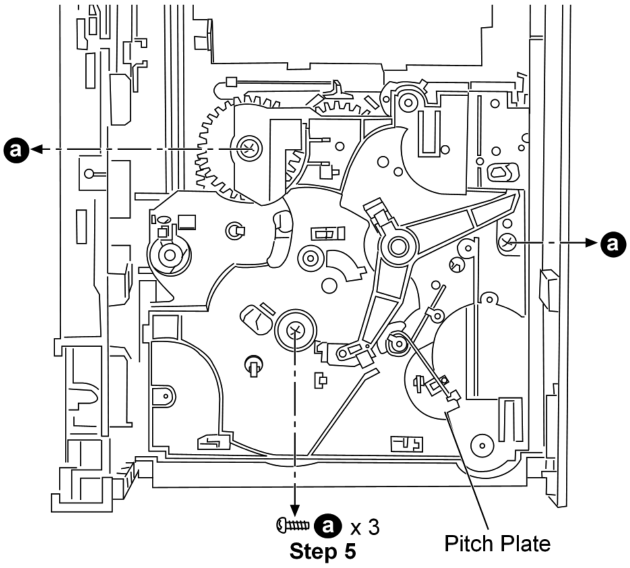

Step 2
UD Rack R
Step 3
Claw
Step 3

Step 2: Slide the UD rack R as arrow shown until it stop.

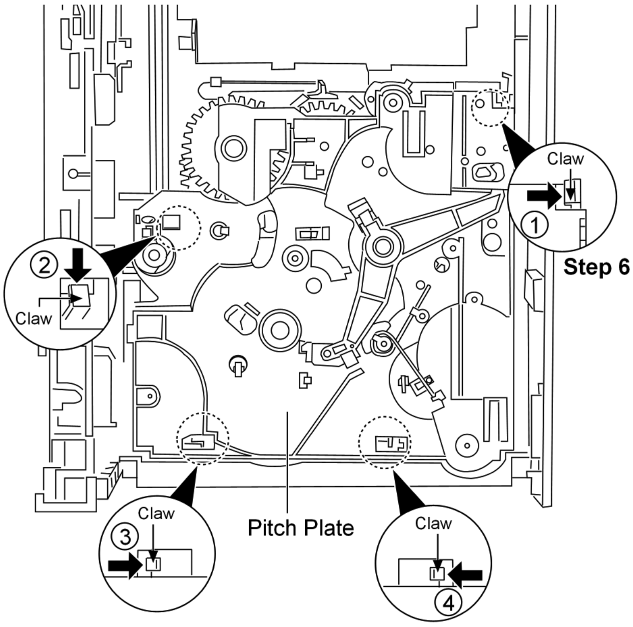
Step 3: Press the claw as arrow shown.


Trigger Gear
Step 4
②
Rib
①

Step 4: Push the claw as arrow shown, then turn the trigger gear clockwise and remove it as arrows shown.


a
a
a x 3
Step 5
Pitch Plate

Step 5: Remove 3 screws.

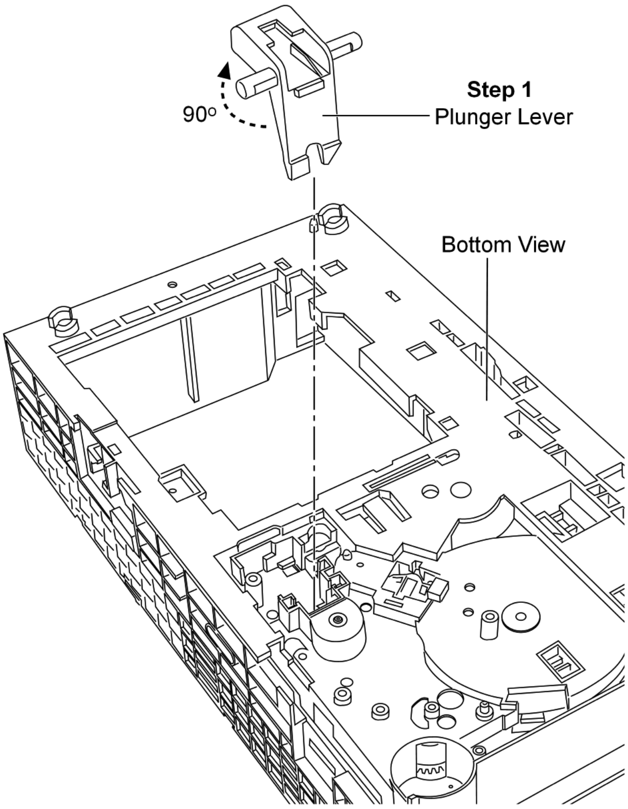

Claw
①
Step 6
②
Claw
Claw
③
Pitch Plate
Claw
④

Step 6: Release 4 claws as arrows shown in order followed by detach the pitch plate.

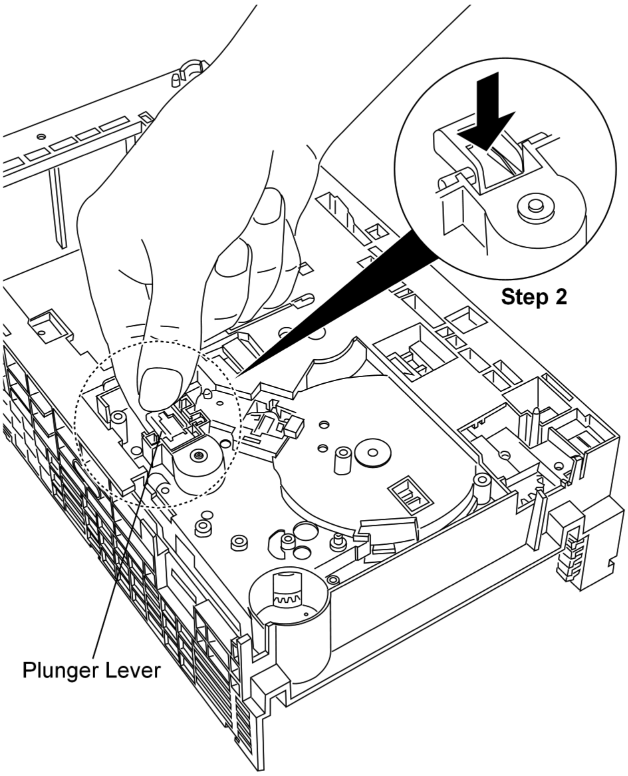
7.2. Assembling Procedure

7.2.1. Assembly of CD Loading Unit

· Assembly of Plunger Lever

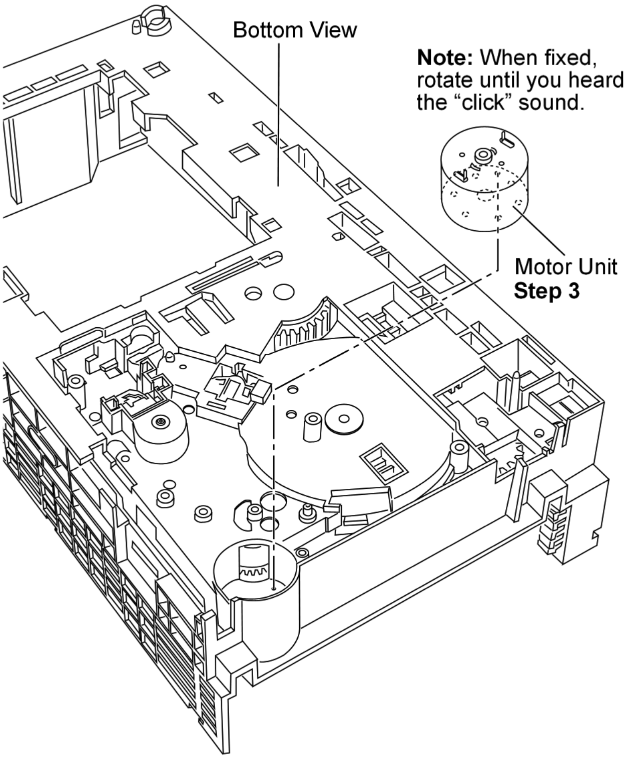

90°
Step 1
Plunger Lever
Bottom View

Step 1: Turn over the unit and install the plunger lever in 90° position.


Step 2
Plunger Lever

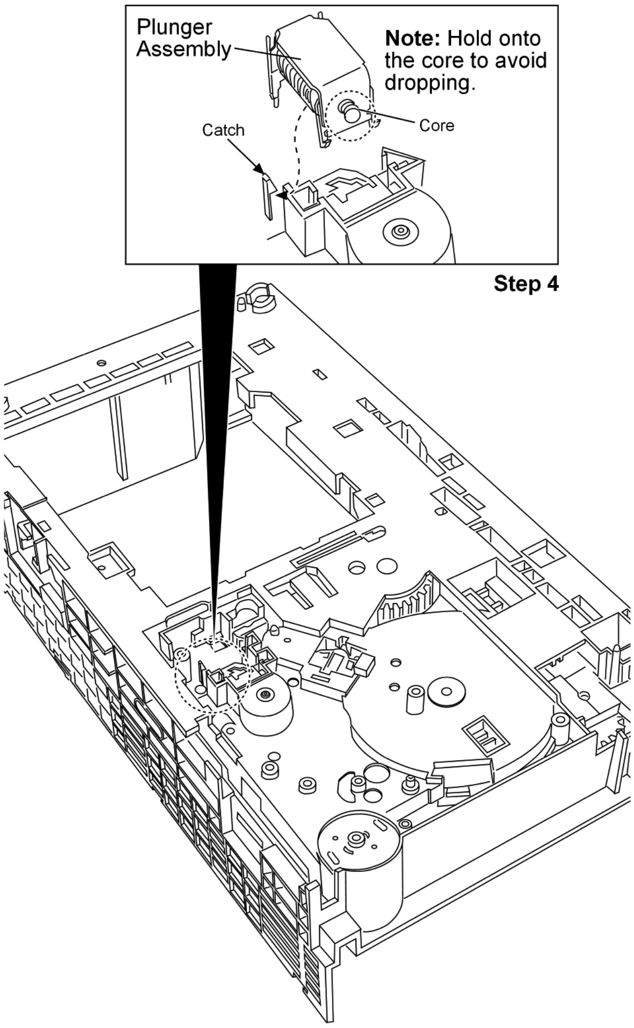
Step 2: Push in the plunger lever as arrow shown.

· Assembly of Motor Unit


Bottom View
Note: When fixed, rotate until you heard the "click" sound.
Motor Unit
Step 3

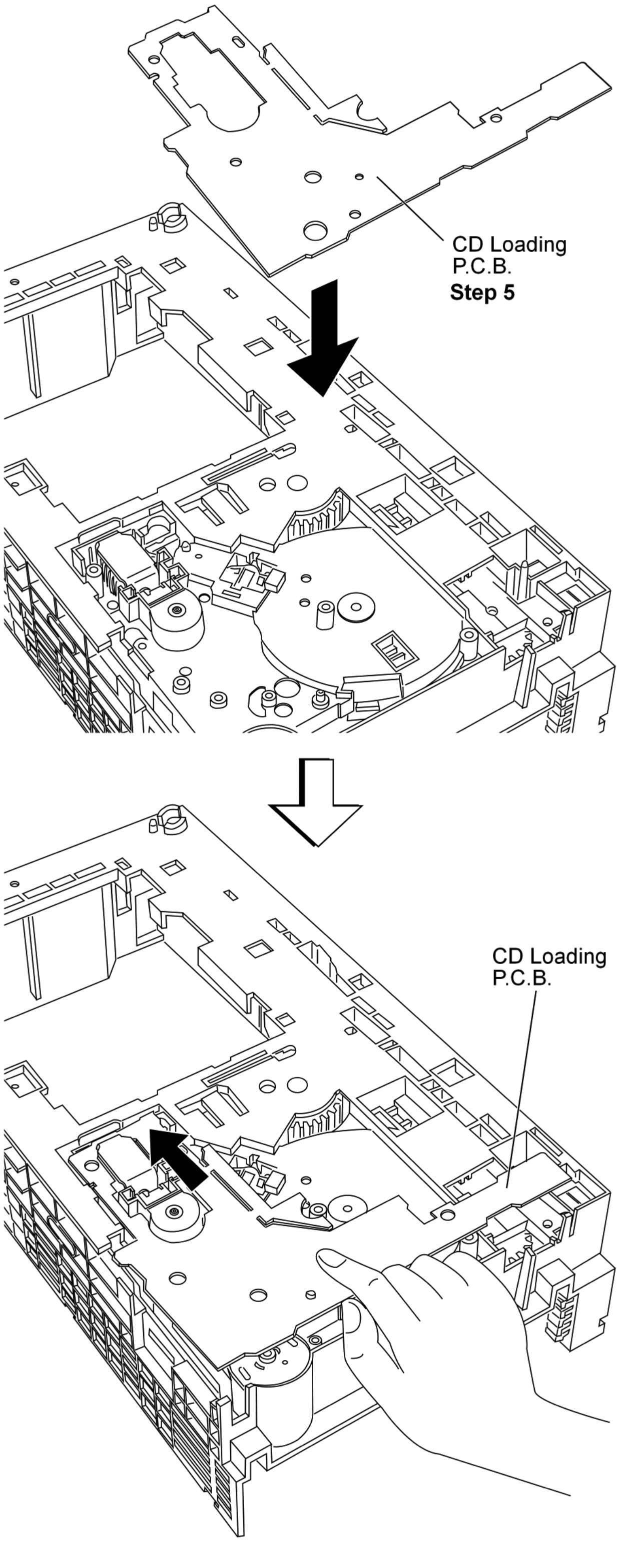
Step 3: Turn over the unit and install the motor unit properly.

· Assembly of Plunger Assembly

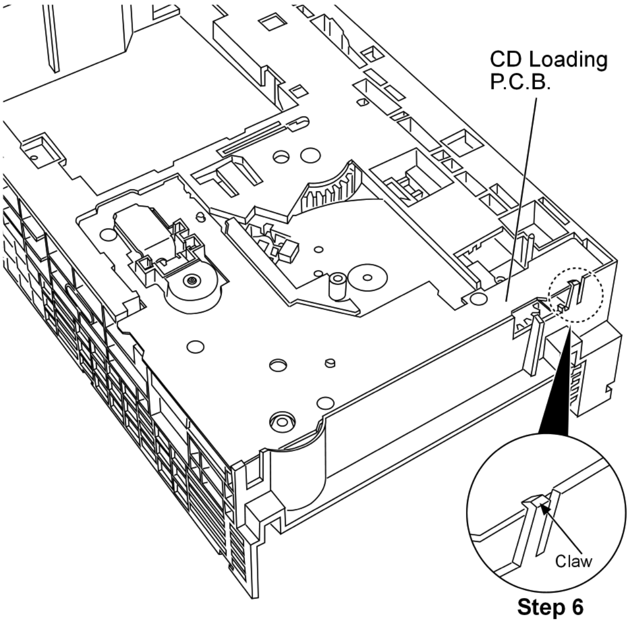

Plunger Assembly
Note: Hold onto the core to avoid dropping.
Catch
Core
Step 4

Step 4: Install the plunger assembly as arrow shown, the catch should be latched.

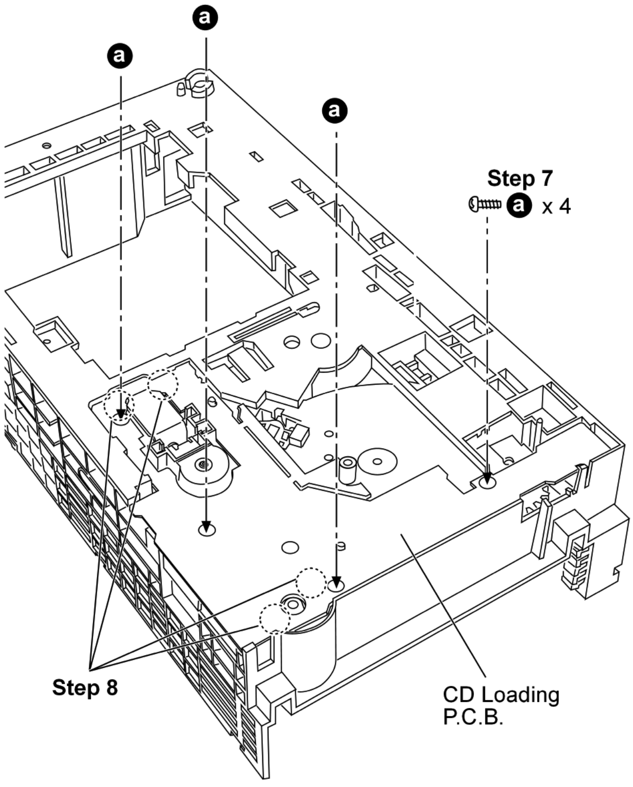
- Assembly of CD Loading P.C.B.


CD Loading P.C.B.
Step 5
CD Loading P.C.B.

Step 5: Install the CD Loading P.C.B. as arrows shown.


CD Loading
P.C.B.
Claw
Step 6

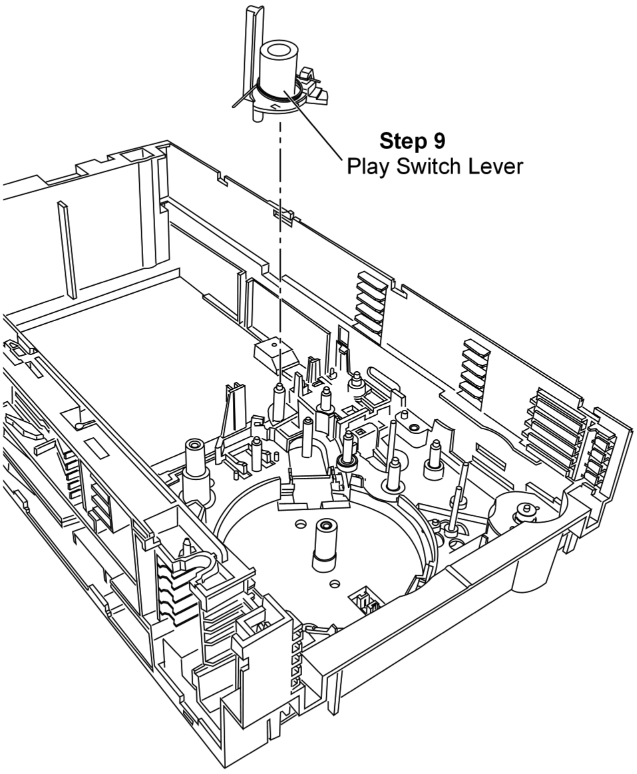
Step 6: The claw should be latched.


a
a
a
Step 7
a x 4
Step 8
CD Loading
P.C.B.

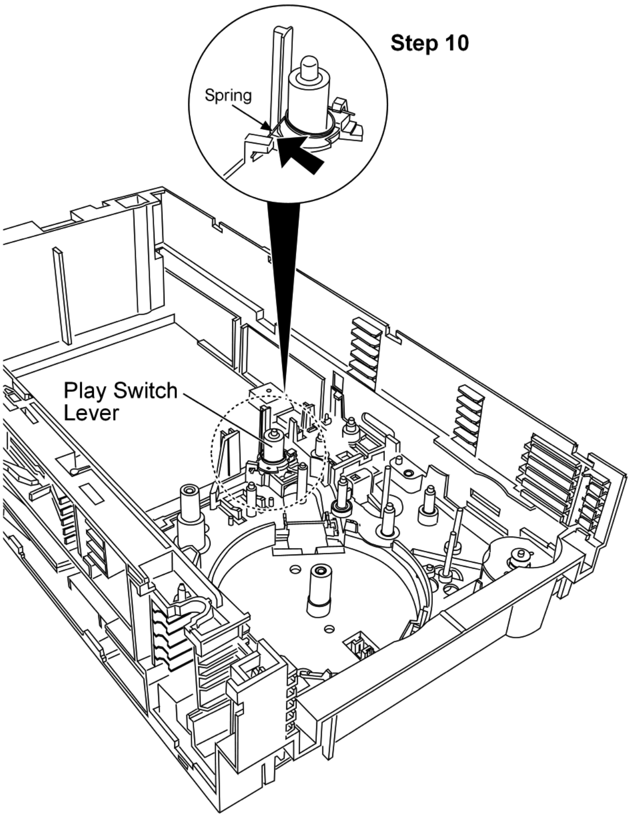
Step 7: Fix it with 4 screws.

Step 8: Solder the 4 points.

· Assembly of play swtich lever

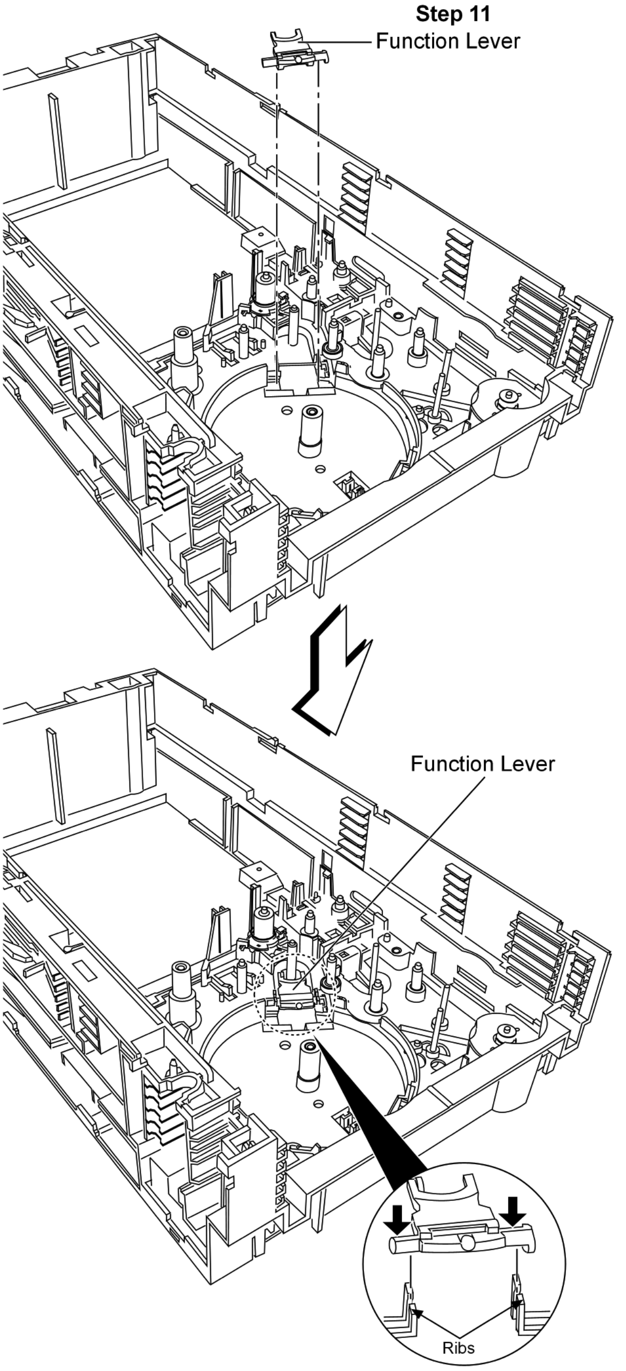

Step 9
Play Switch Lever

Step 9: Install the play switch lever.


Step 10
Spring
Play Switch
Lever

Step 10: Fix the spring below the rib as arrow shown.

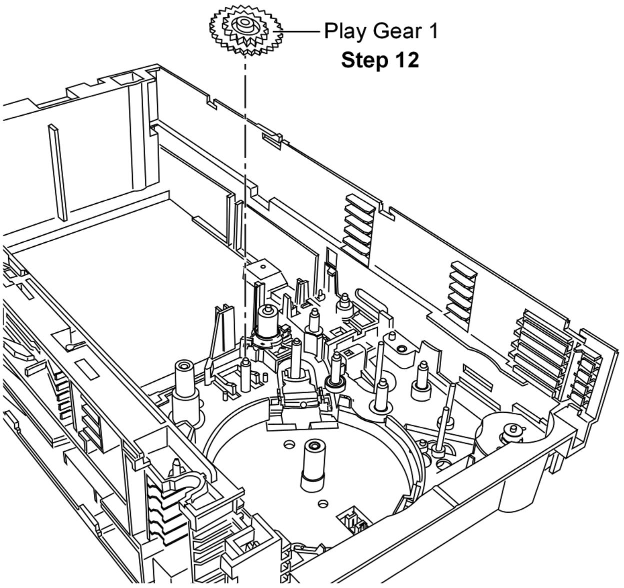
· Assembly of function lever

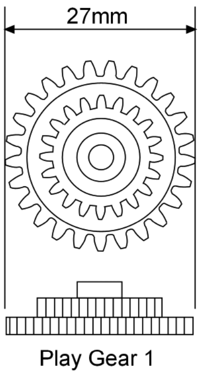

Step 11
Function Lever
Function Lever
Ribs

Step 11: Install the function lever.

Note: Ensure the function lever seats properly onto the ribs. A click sound will be heard when installing.

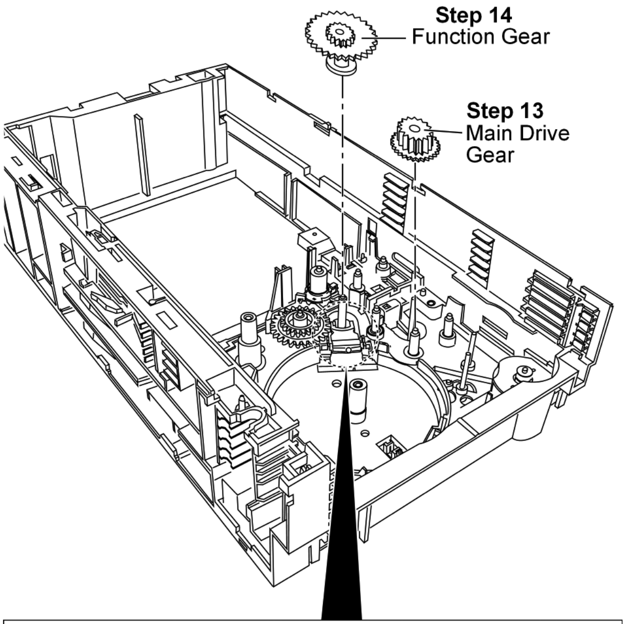
· Assembly of play gear 1


Play Gear 1
Step 12

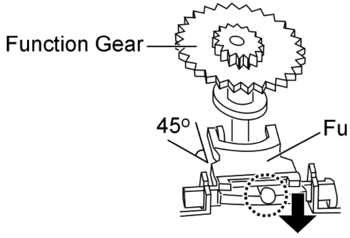

27mm
Play Gear 1

Step 12: Install the play gear 1.

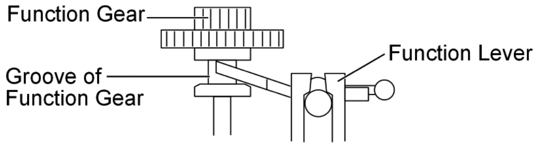
· Assembly of function gear and main drive gear

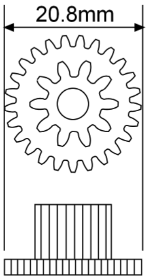

Step 14
Function Gear
Step 13
Main Drive Gear

1. Press the ◌ part as arrow shown below and pull up the function lever 45°.

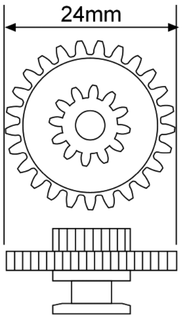

Function Gear
45°
Function Lever

2. Insert the function lever into the groove of function gear.


Function Gear
Groove of Function Gear
Function Lever



Main Drive Gear

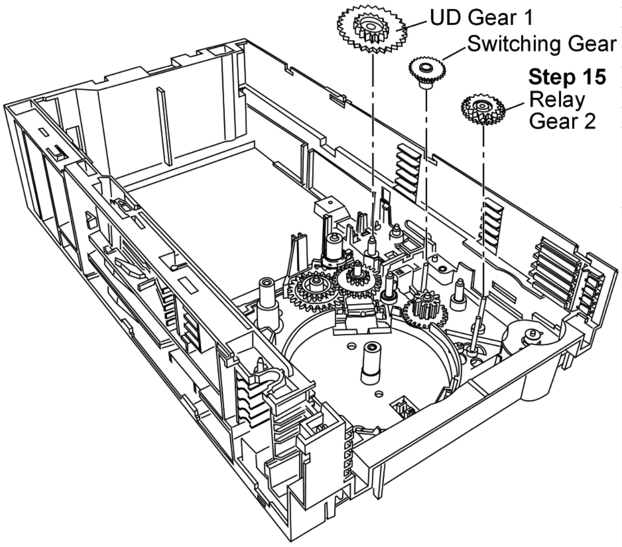


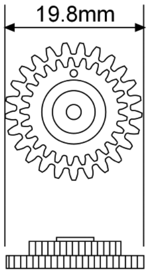
Function Gear

Step 13: Install the main drive gear.

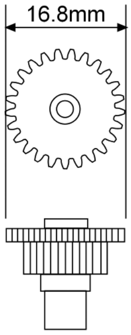
Step 14: Install the function gear.

· **Assembly of gears**

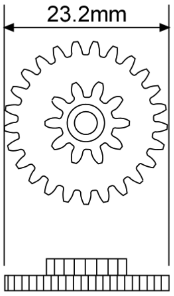

UD Gear 1
Switching Gear
Step 15
Relay Gear 2



Relay Gear 2

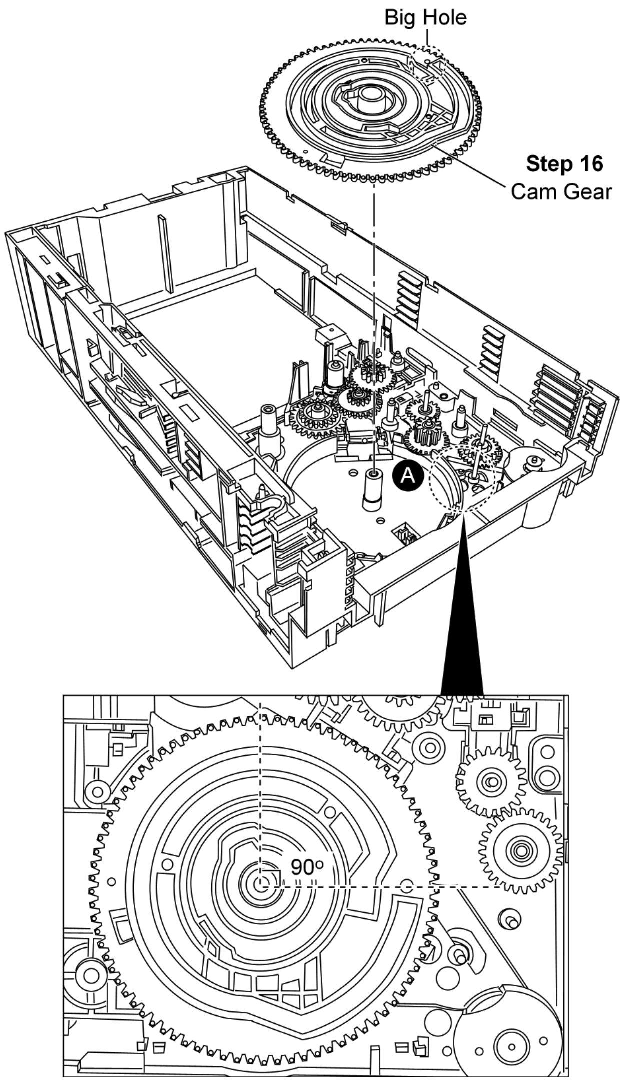


Switching Gear

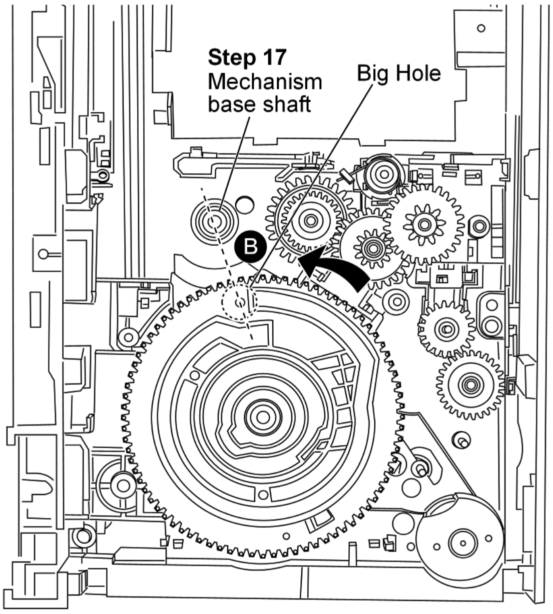


UD Gear 1

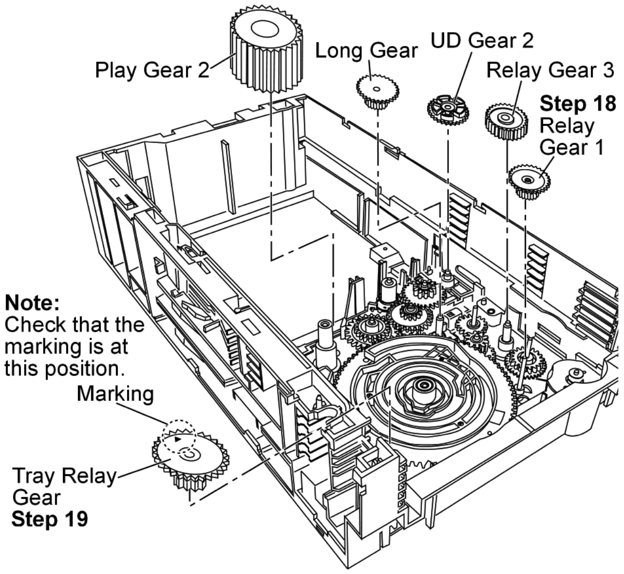
Step 15: Install the relay gear 2, switching gear and UD gear 1 respectively.

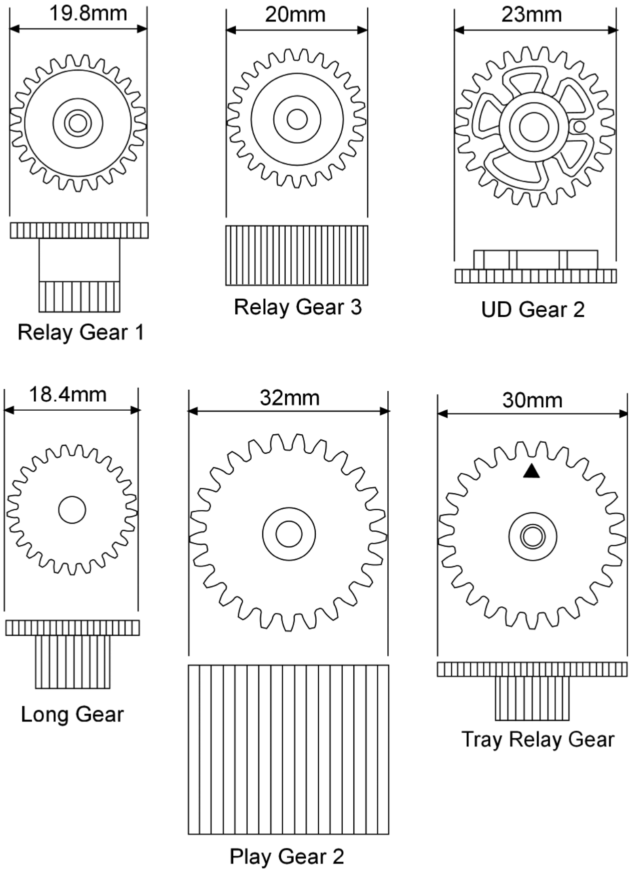

Big Hole
Step 16
Cam Gear
A
90°

Step 16: Install the cam gear. Make sure the big hole is fix at the position (A) at 90°


Step 17
Mechanism base shaft
Big Hole
B

Step 17: Turn the cam gear anti-clockwise until the big hole stop at position (B).

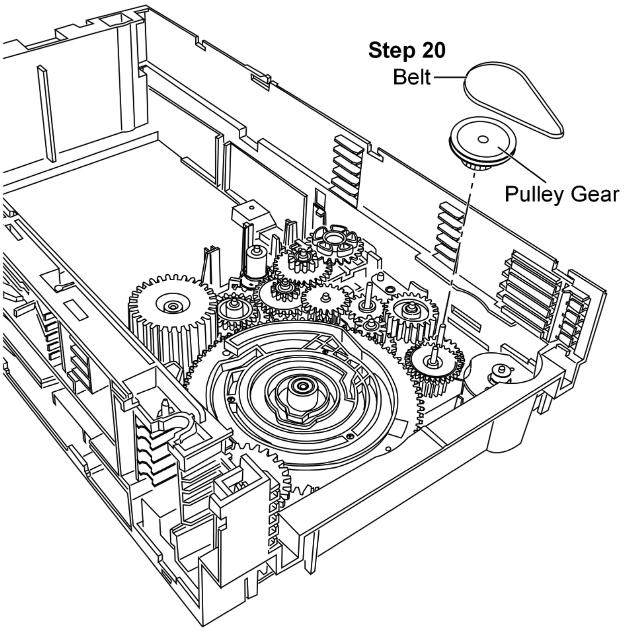

Play Gear 2
Long Gear
UD Gear 2
Relay Gear 3
Step 18
Relay Gear 1
Note:
Check that the marking is at this position.
Marking
Tray Relay Gear
Step 19

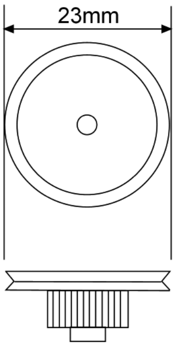

19.8mm
Relay Gear 1
20mm
Relay Gear 3
23mm
UD Gear 2
18.4mm
Long Gear
32mm
Play Gear 2
30mm
Tray Relay Gear

Step 18: Install the relay gear 1, relay gear 3, UD gear 2, long gear and play gear 2 respectively.

Step 19: Install the tray relay gear.

· Assembly of pulley gear and belt


Step 20
Belt
Pulley Gear

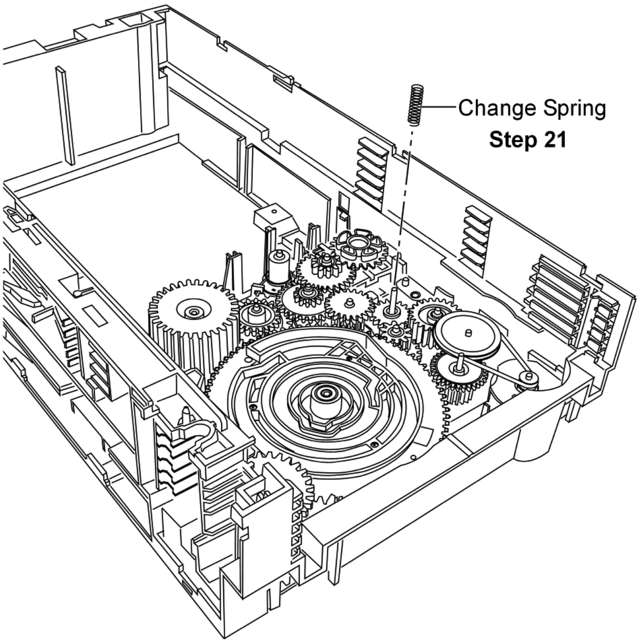


Pulley Gear

Step 20: Install the pulley gear followed by the belt.

Note: Do not apply the grease to the belt.

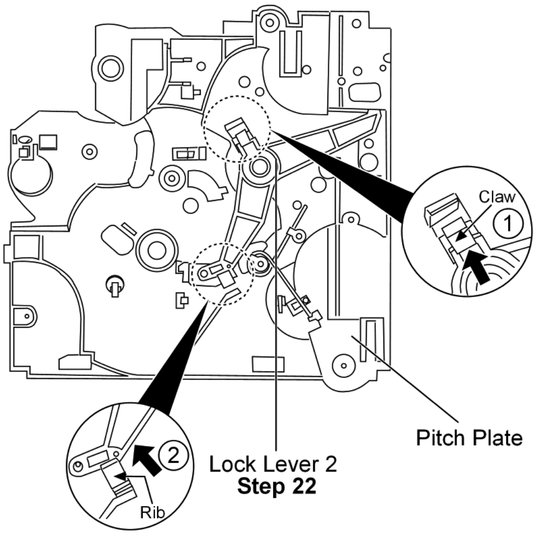
· **Assembly of change spring**


Change Spring
Step 21

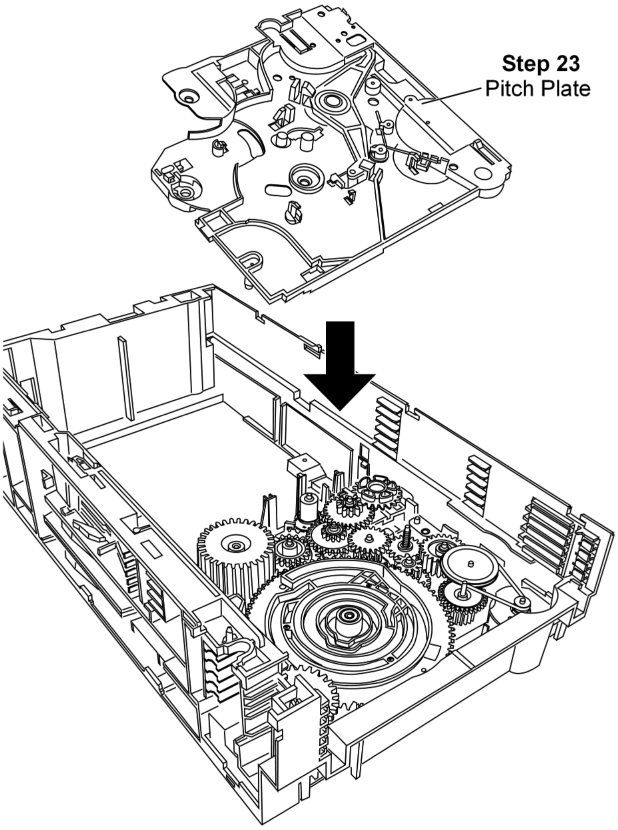
Step 21: Install the change spring.

Caution: Handle the change spring carefully, do not lose it. Ensure the change spring seats properly on the groove of long gear.

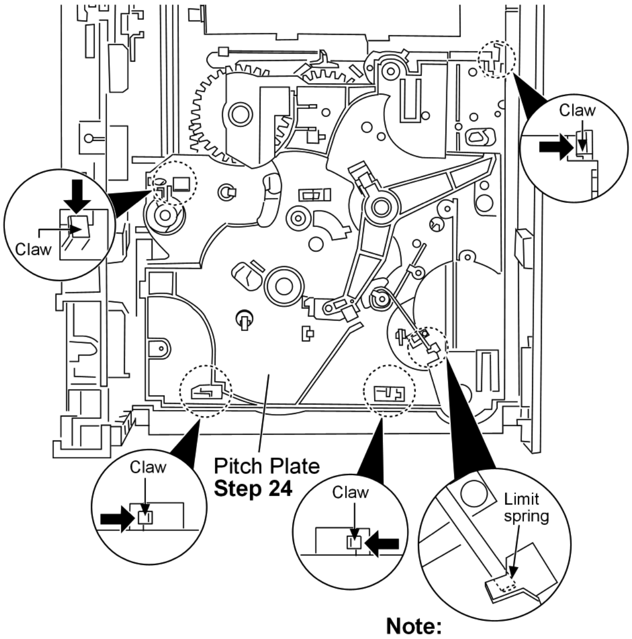
· **Assembly of pitch plate**


Claw
①
②
Rib
Lock Lever 2
Step 22
Pitch Plate

Step 22: Install the lock lever 2 as arrows whown in sequence.

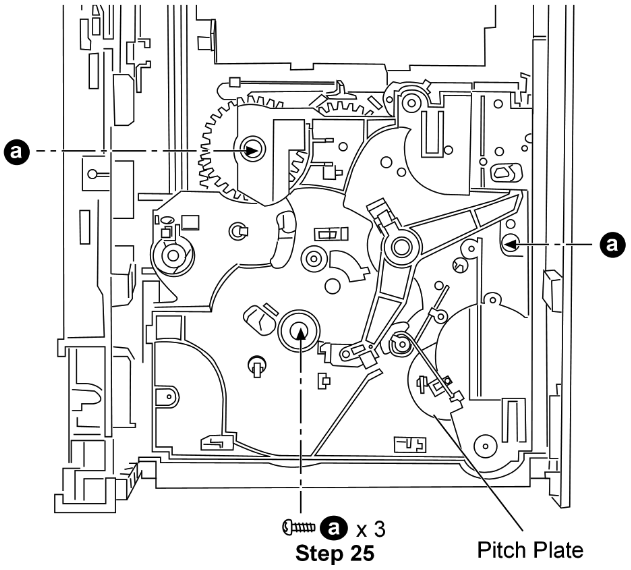

Step 23
Pitch Plate

Step 23: Install the pitch plate.


Claw
Claw
Claw
Pitch Plate
Step 24
Claw
Limit spring

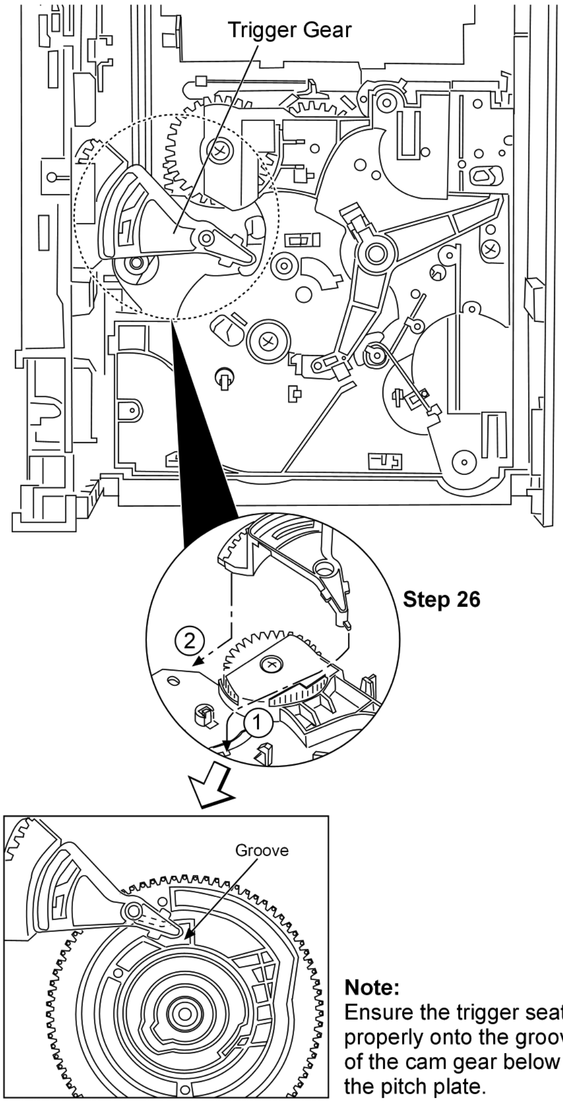
Note:
Check that the tip of
the limit spring is hide
under the pitch plate.

Step 24: The 4 claws should be latched properly.


a
a
a x 3
Step 25
Pitch Plate

Step 25: Fix it with 3 screws

· Assembly of trigger gear

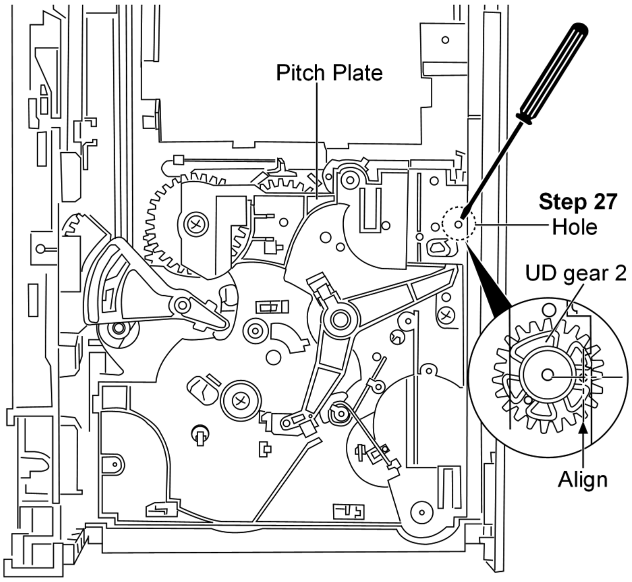

Trigger Gear
Step 26
2
1
Groove

Note:
Ensure the trigger seats
properly onto the groove
of the cam gear below
the pitch plate.

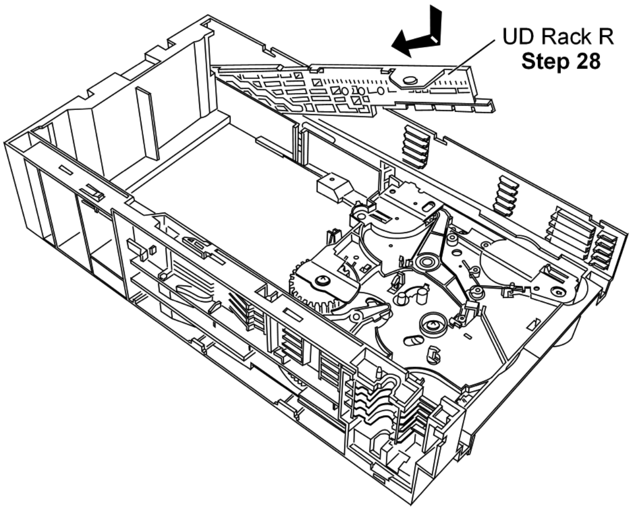
Step 26: Install the trigger gear in sequence.

Note: Ensure the trigger seats properly onto the groove (cam gear).

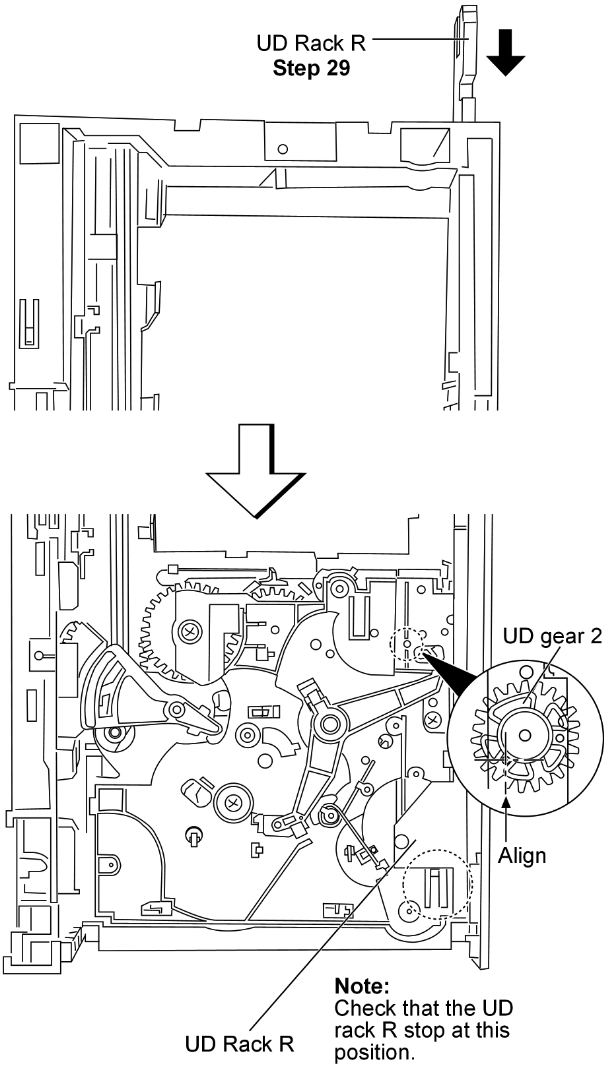
· Assembly of UD rack R


Pitch Plate
Step 27
Hole
UD gear 2
Align

Step 27: Use the screwdriver to turn the hole on the UD gear 2 align with the pitch plate hole.

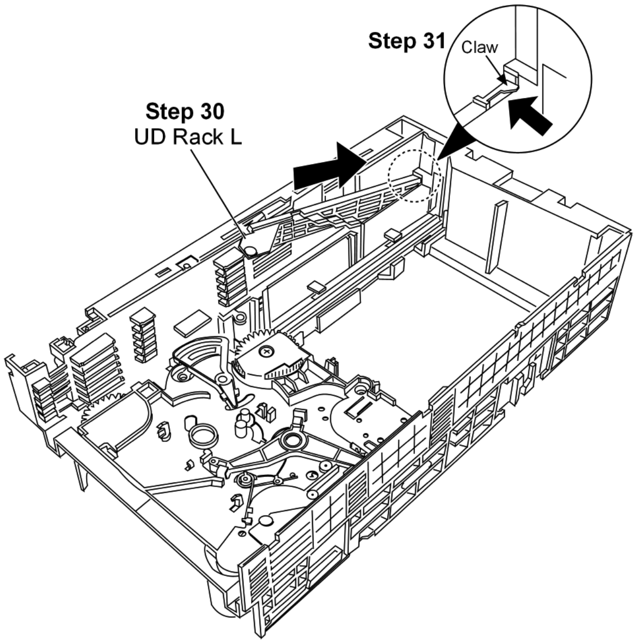

UD Rack R
Step 28

Step 28: Insert the UD rack R as arrow shown.


UD Rack R
Step 29
UD gear 2
Align
UD Rack R
Note:
Check that the UD rack R stop at this position.

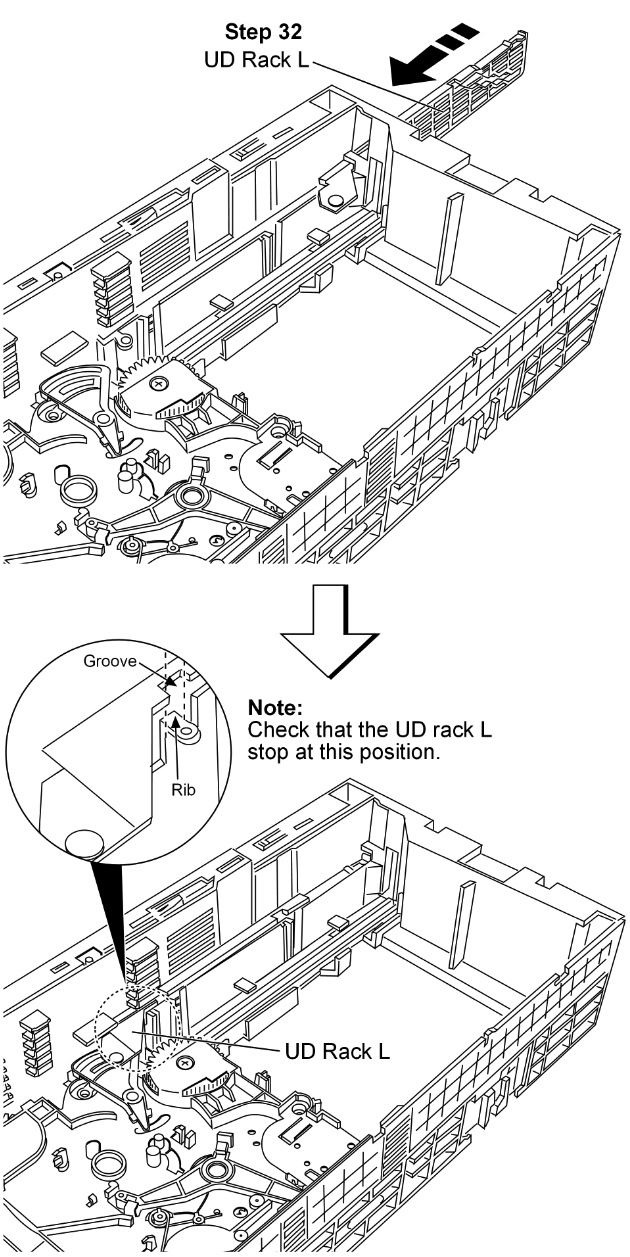
Step 29: Push the UD rack R as arrow shown.

· Assembly of UD rack L


Step 31
Claw
Step 30
UD Rack L

Step 30: Insert the UD rack L as arrow shown.

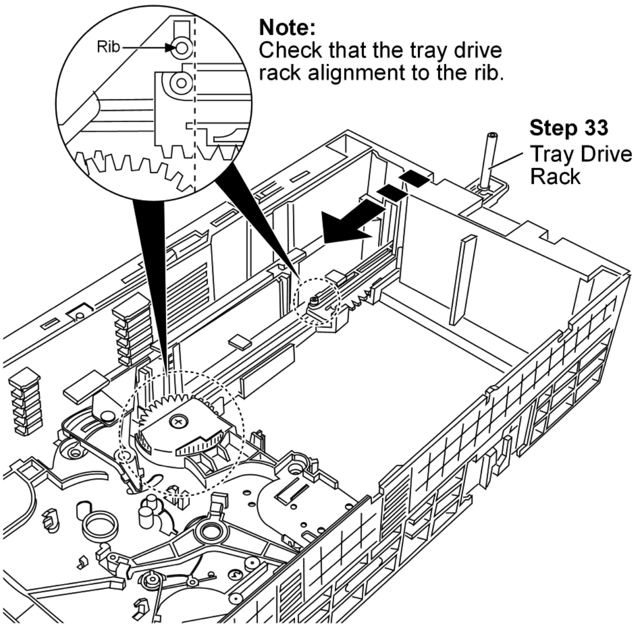
Step 31: Push the claw as arrow shown.


Step 32
UD Rack L
Groove
Rib
UD Rack L

Note:
Check that the UD rack L
stop at this position.

Step 32: Pull the UD rack L as arrow shown.

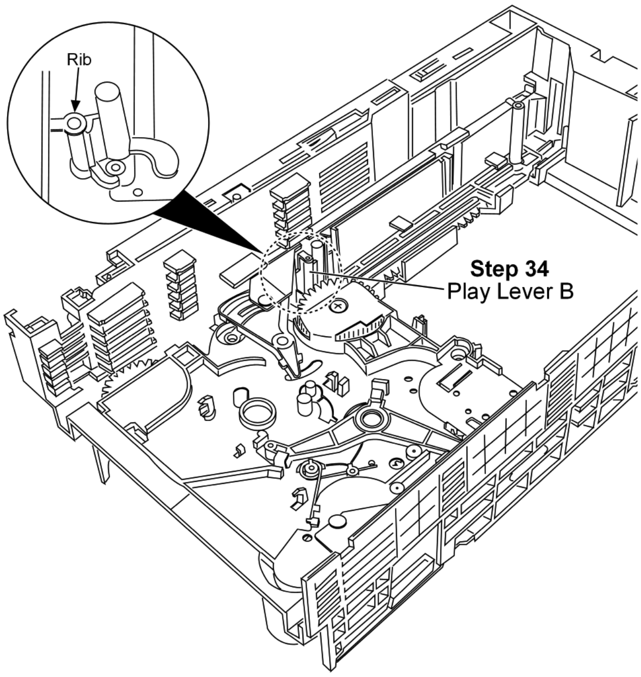
· **Assembly of tray drive rack**


Rib
Step 33
Tray Drive
Rack

Note:
Check that the tray drive
rack alignment to the rib.

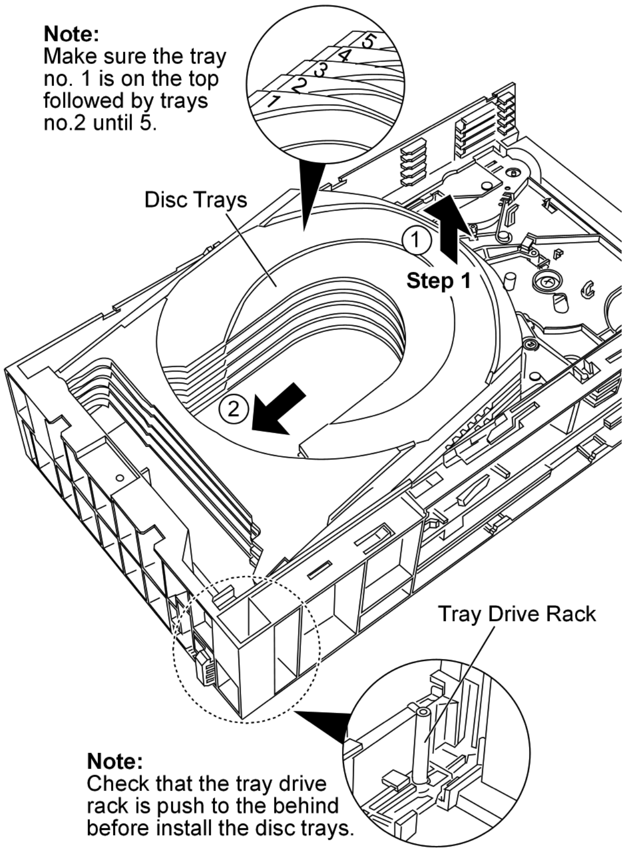
Step 33: Install the tray drive rack as arrow shown.

· **Assembly of play lever B**


Rib
Step 34
Play Lever B

Step 34: Install the play lever B below the rib.

7.2.2. Assembly of Disc Trays

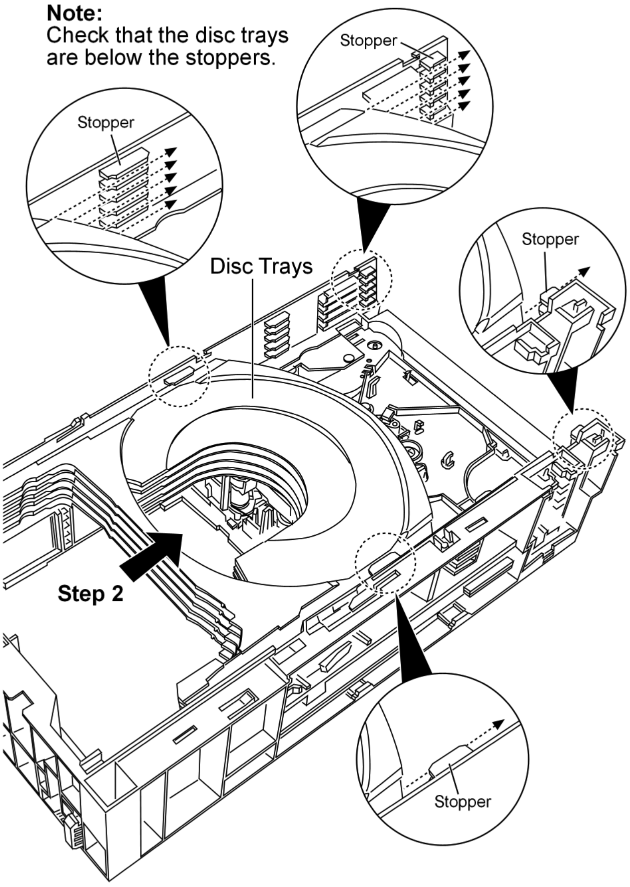


Note:
Make sure the tray no. 1 is on the top followed by trays no.2 until 5.

Note:
Check that the tray drive rack is push to the behind before install the disc trays.

5
4
3
2
1
Disc Trays
①
Step 1
②
Tray Drive Rack

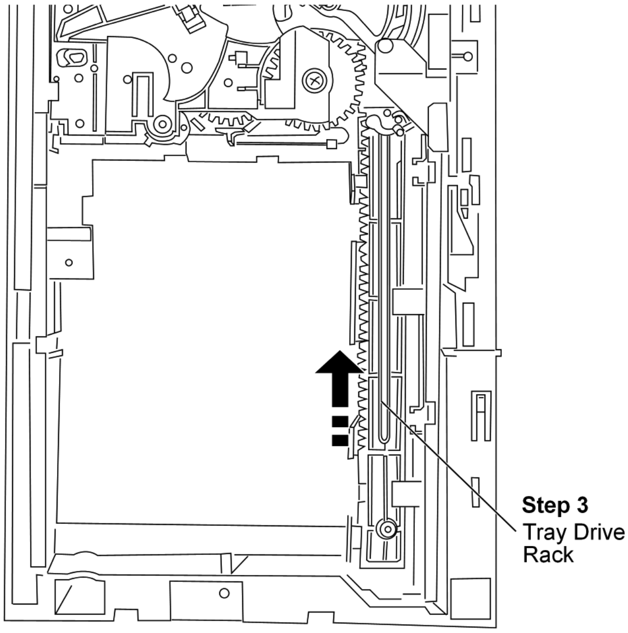
Step 1: Tilt and fix the 5 disc trays as arrows shown.



Note:
Check that the disc trays are below the stoppers.

Stopper
Stopper
Disc Trays
Stopper
Step 2
Stopper

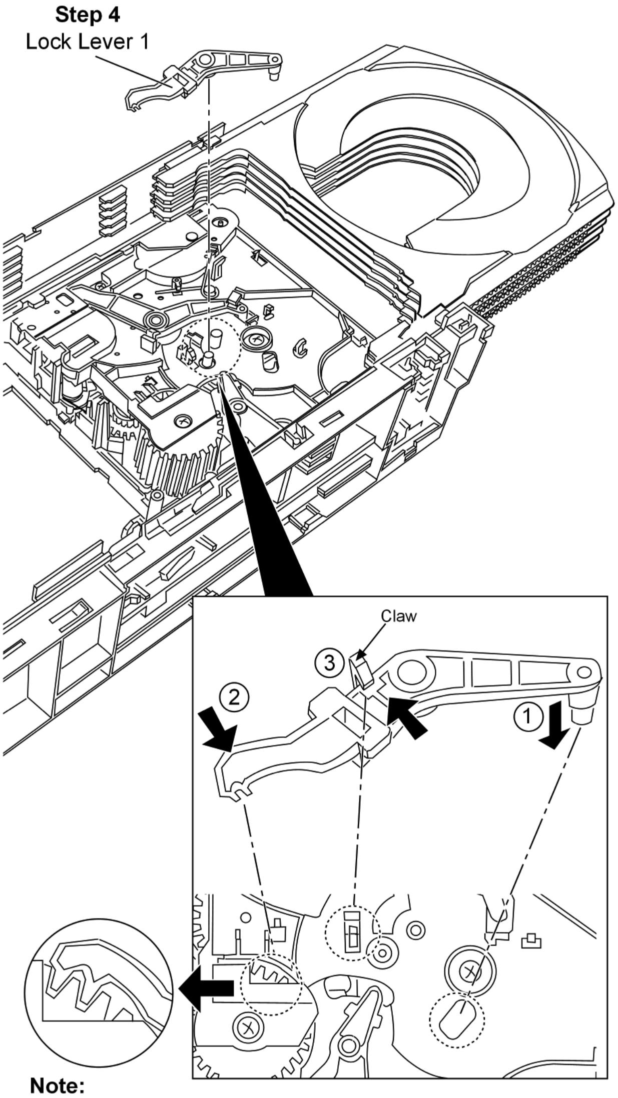
Step 2: Push the 5 disc trays as arrow shown until it stop.



Step 3
Tray Drive Rack

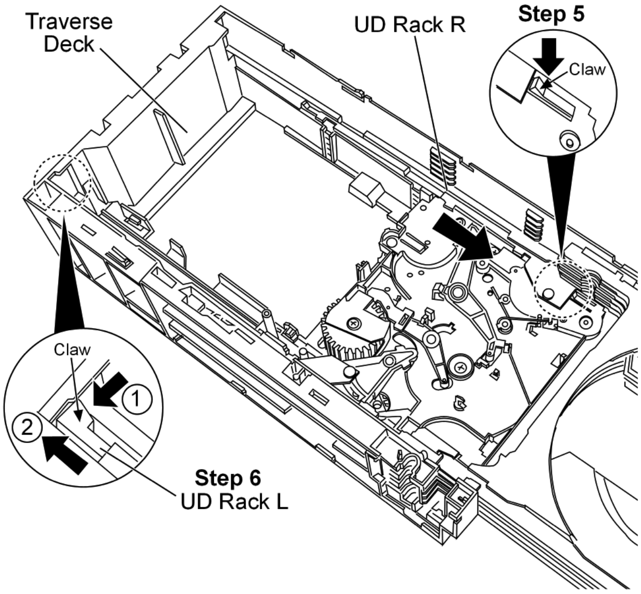
Step 3: Push the tray drive rack as arrow shown until it stop.

· **Assembly of lock lever 1**


Step 4
Lock Lever 1
Claw
3
2
1

Note:
Check that the lock lever 1
is alignment to the gear.

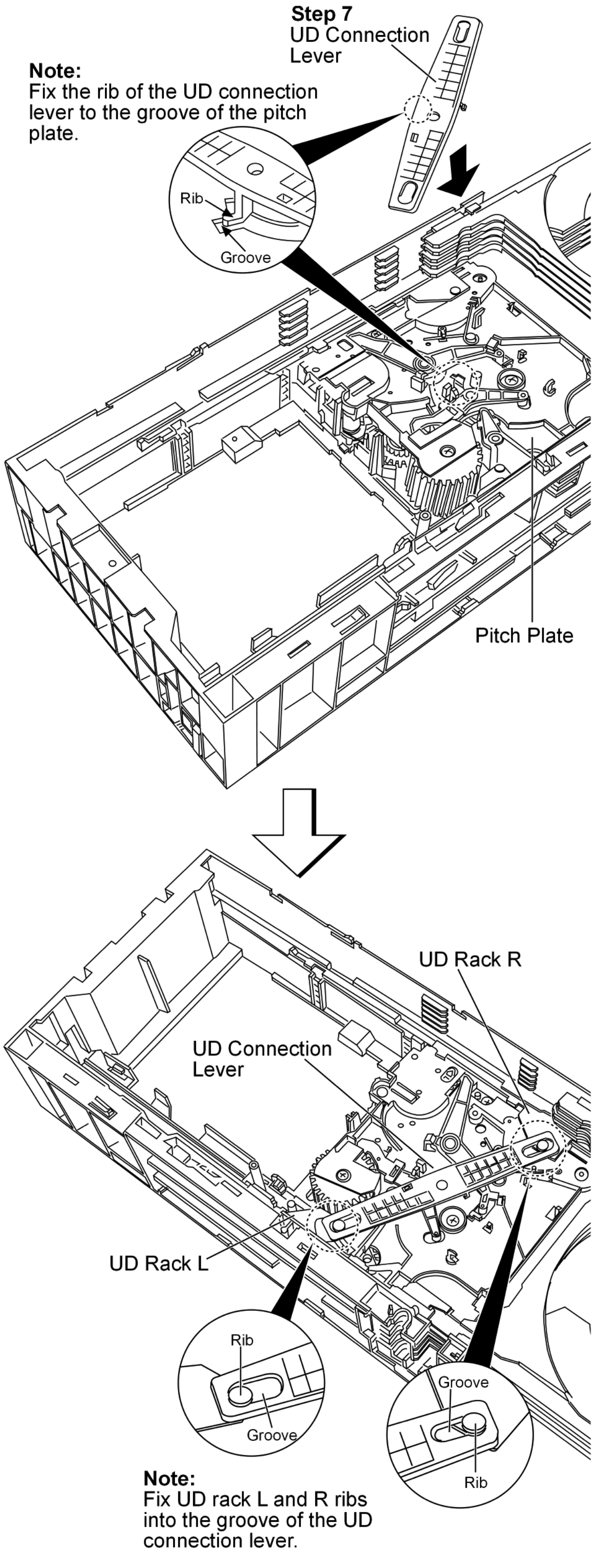
Step 4: Fix the lock lever 1 onto the pitch plate as arrow shown in sequence.


Traverse Deck
UD Rack R
Step 5
Claw
Claw
1
2
Step 6
UD Rack L

Step 5: Press and hold the claw at the pitch plate then push the UD rack R as arrows shown.

Step 6: Push the claw and slide the UD rack L as arrows shown.

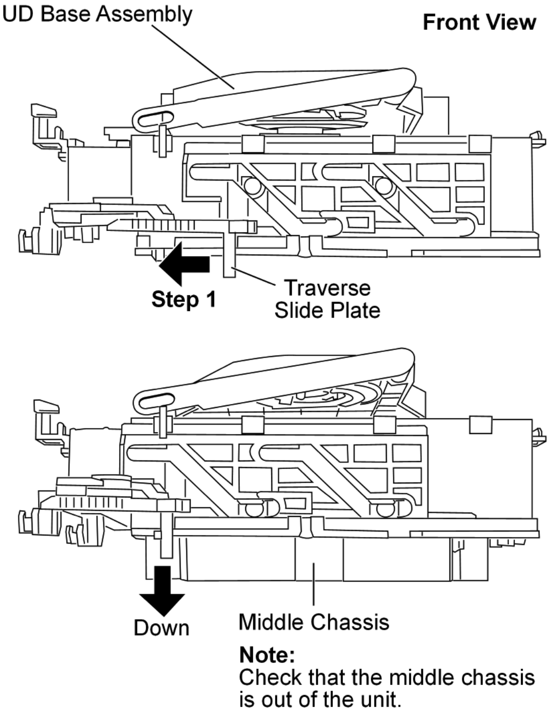
· **Assembly of UD connection lever**


Step 7
UD Connection Lever
Note:
Fix the rib of the UD connection lever to the groove of the pitch plate.
Rib
Groove
Pitch Plate
UD Rack R
UD Connection Lever
UD Rack L
Rib
Groove
Groove
Rib
Note:
Fix UD rack L and R ribs into the groove of the UD connection lever.

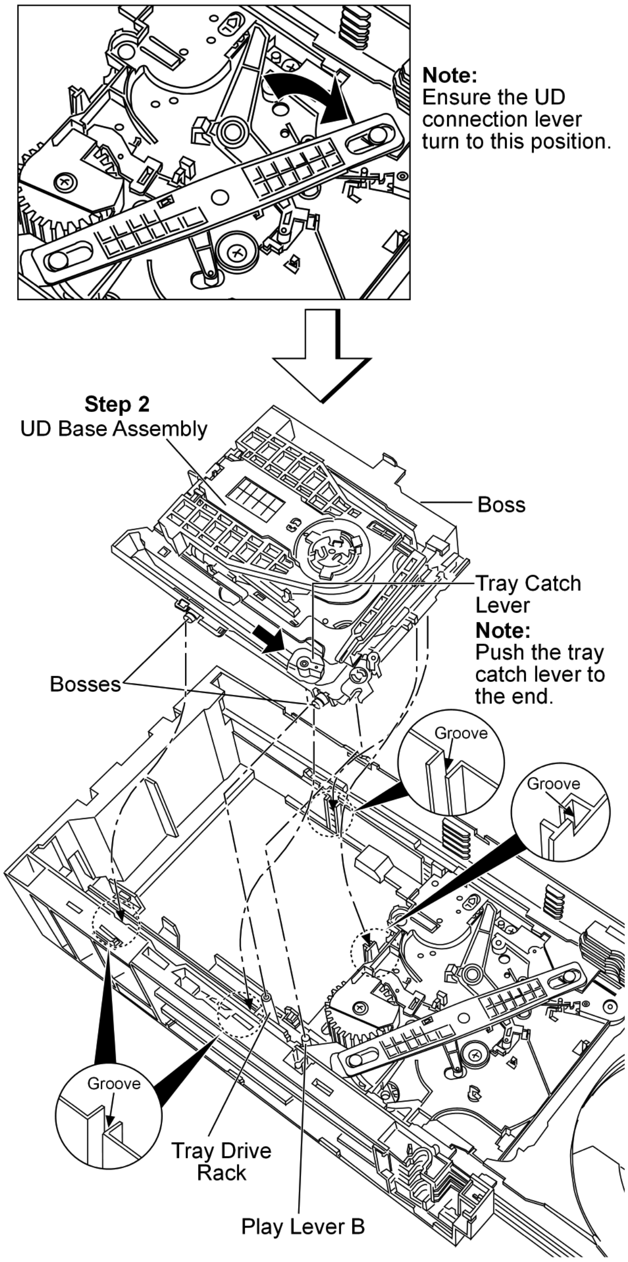
Step 7: Install the UD connection lever.

- Follow the (Step 1) to (Step 12) of item 7.2.3. (Assembly of UD Base Assembly)

7.2.3. Assembly of UD Base Assembly


UD Base Assembly
Front View
Step 1
Traverse Slide Plate
Down
Middle Chassis
Note:
Check that the middle chassis is out of the unit.

Step 1: Push the traverse slide plate as arrow shown.

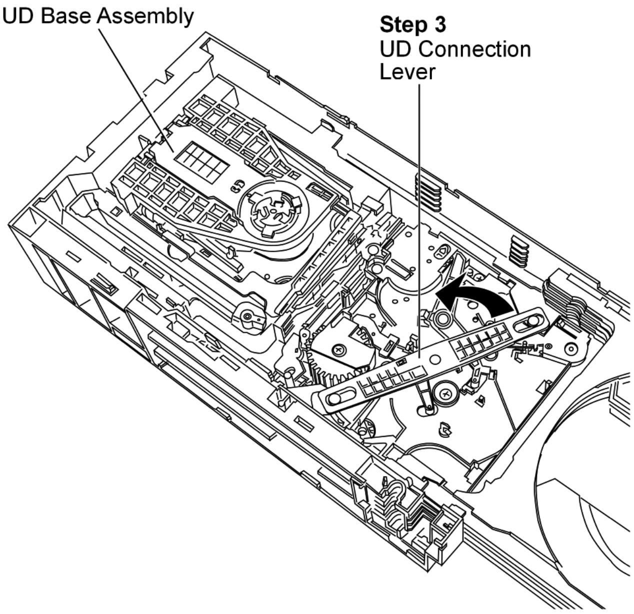

Note:
Ensure the UD connection lever turn to this position.

Step 2
UD Base Assembly
Boss
Tray Catch Lever
Bosses
Groove
Groove
Groove
Tray Drive Rack
Play Lever B

Note:
Push the tray catch lever to the end.

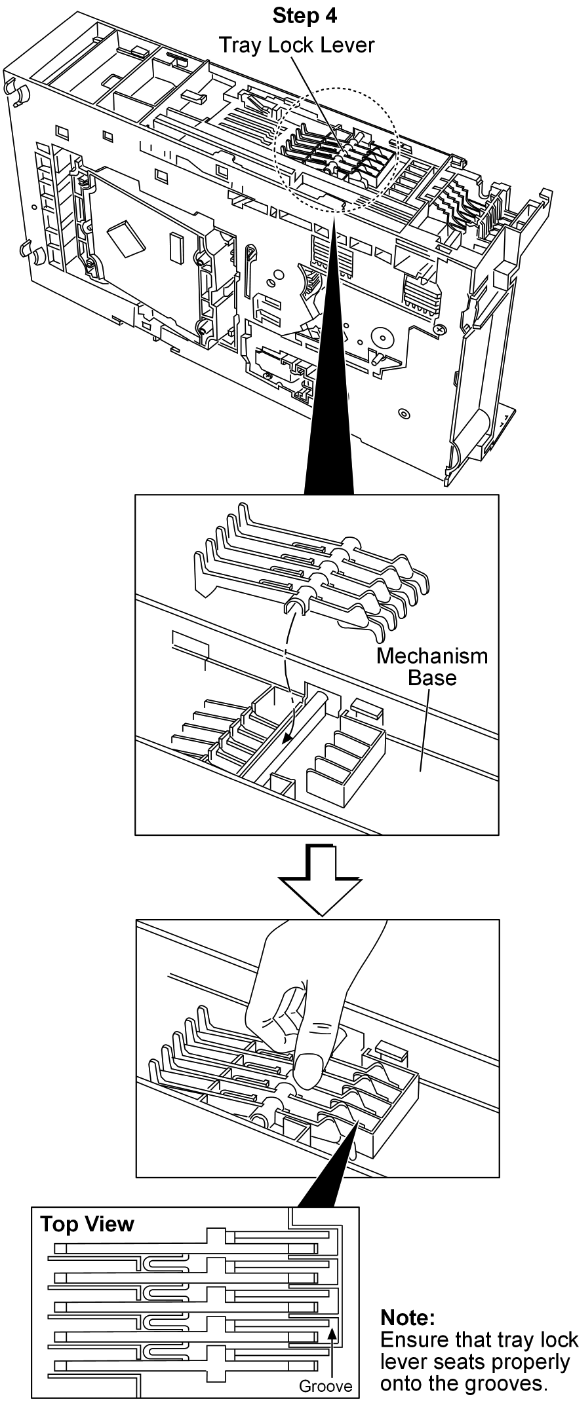
Step 2: Install the UD base assembly.

Note: Ensure the UD base assembly seats properly into the grooves and engage with the play lever B and tray drive rack.


UD Base Assembly
Step 3
UD Connection Lever

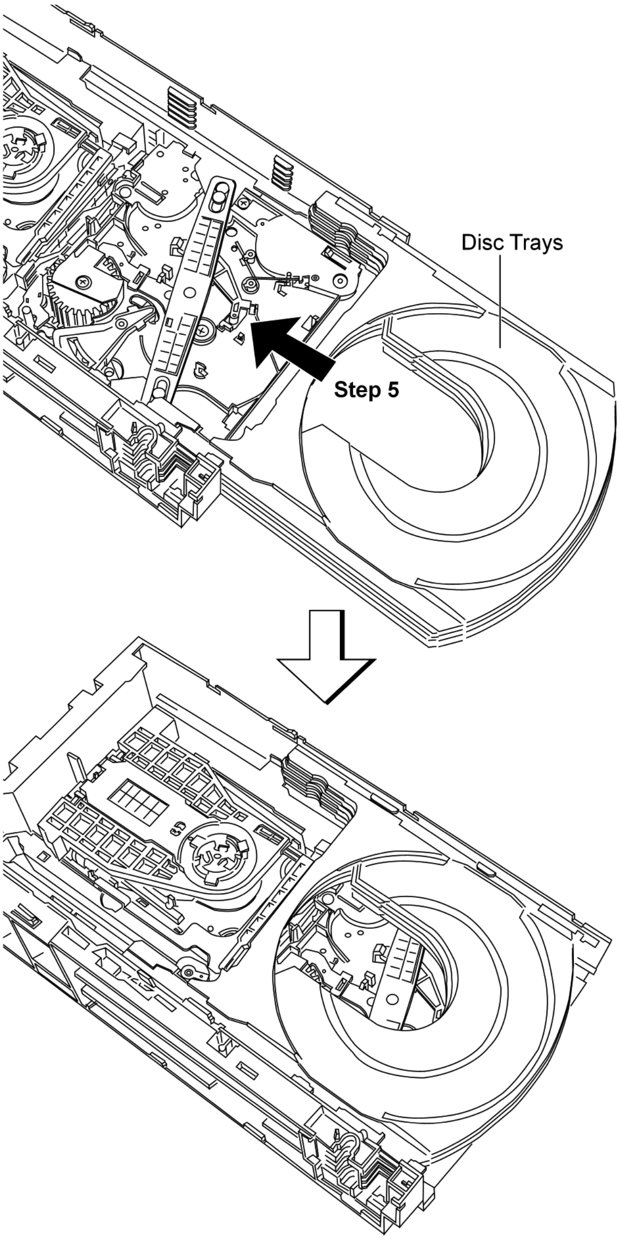
Step 3: Turn the UD connection lever anti-clockwise, the UD base assembly will move downwards.

Note: When the UD connection lever is turn and the UD base assembly did not move downwards, check for step 1 to step 3 again.


Step 4
Tray Lock Lever
Mechanism Base
Top View
Groove

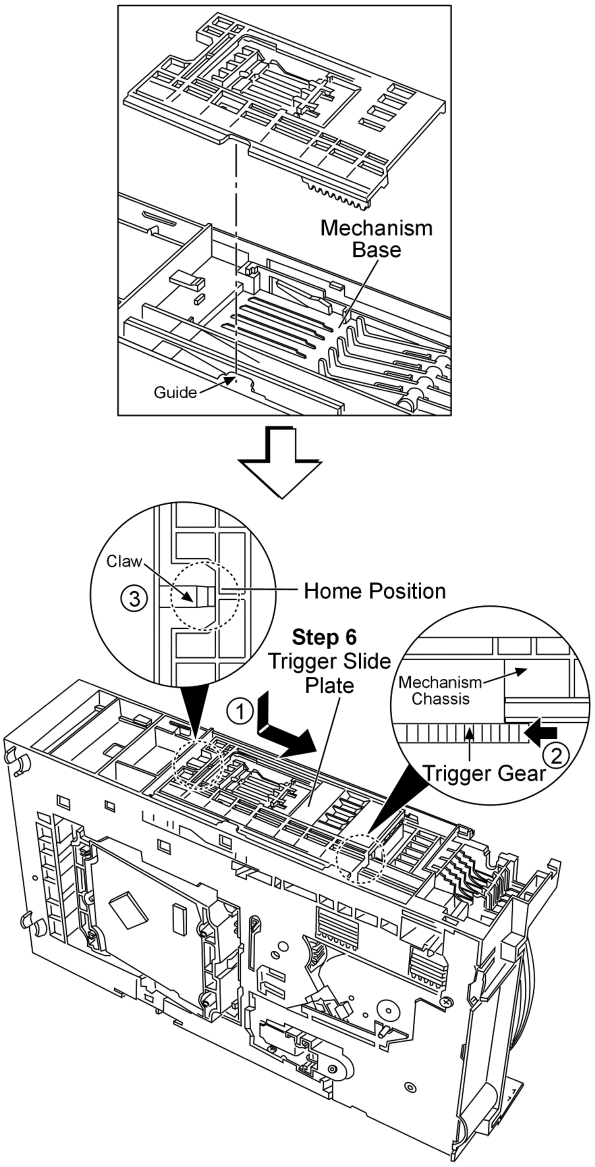
Note:
Ensure that tray lock lever seats properly onto the grooves.

Step 4: Install the tray lock lever to the mechanism base and push the tray lock lever with a hand to fix it.

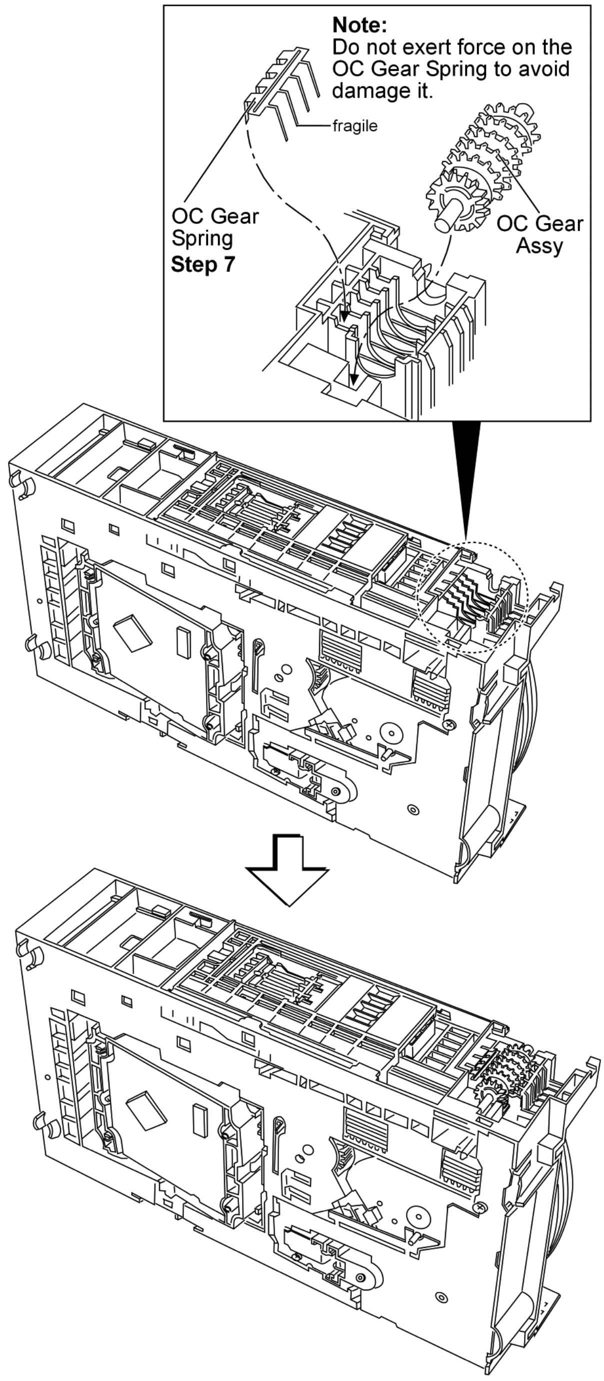

Disc Trays
Step 5

Step 5: Push the disc trays back to the unit as arrow shown.

· **Assembly of Trigger Slide Plate**


Mechanism Base
Guide
Claw
③
Home Position
Step 6
Trigger Slide Plate
①
Mechanism Chassis
②
Trigger Gear

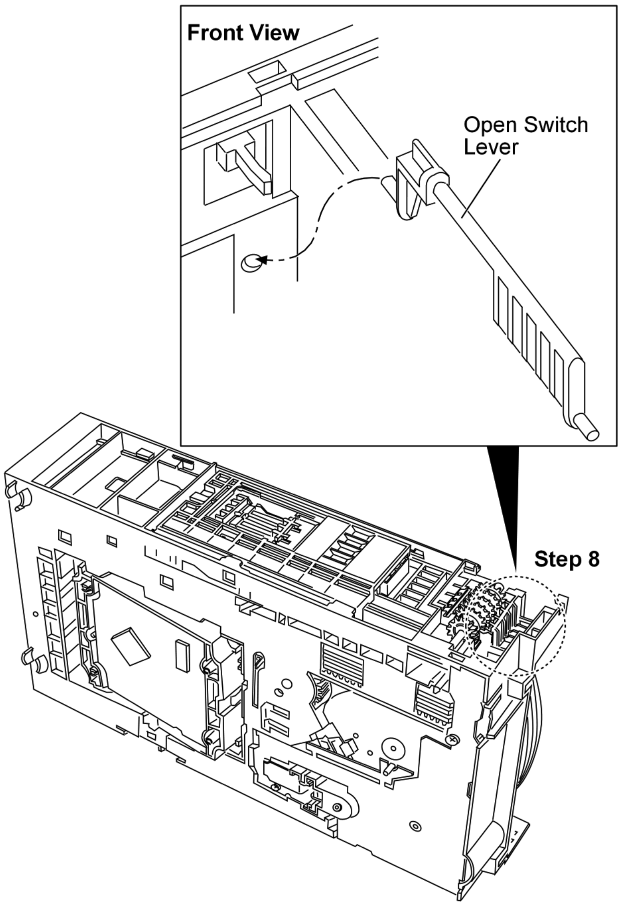
Step 6: Install the trigger slide plate, push forwards and push the trigger gear as arrows shown until locked by the claw.


Note:
Do not exert force on the OC Gear Spring to avoid damage it.

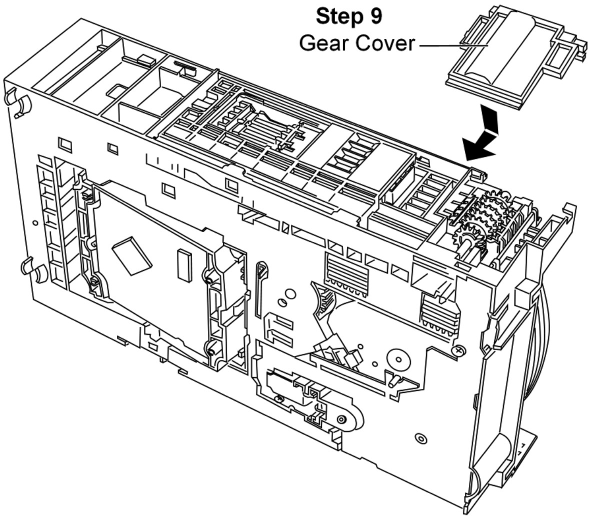
fragile
OC Gear Spring
Step 7
OC Gear Assy

Step 7: Install the OC gear spring followed by the OC gear assy.

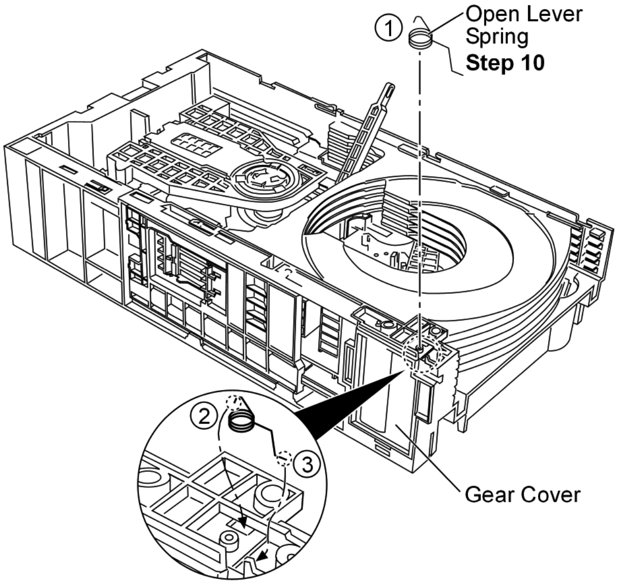
Caution: OC gear free to rotate after assembly


Front View
Open Switch Lever
Step 8

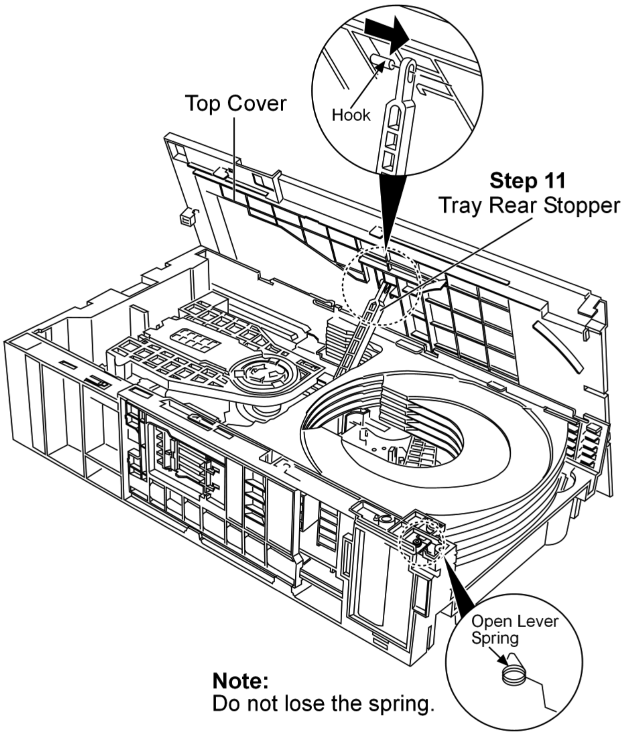
Step 8: Install the open switch lever.


Step 9
Gear Cover

Step 9: Install the gear cover as arrow shown.

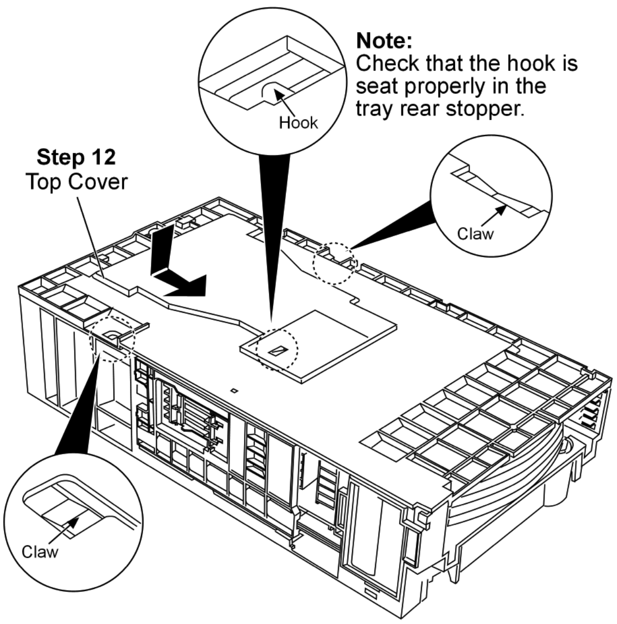

①
Open Lever Spring
Step 10
②
③
Gear Cover

Step 10: Install the open lever spring.


Top Cover
Hook
Step 11
Tray Rear Stopper
Open Lever Spring

Note:
Do not lose the spring.

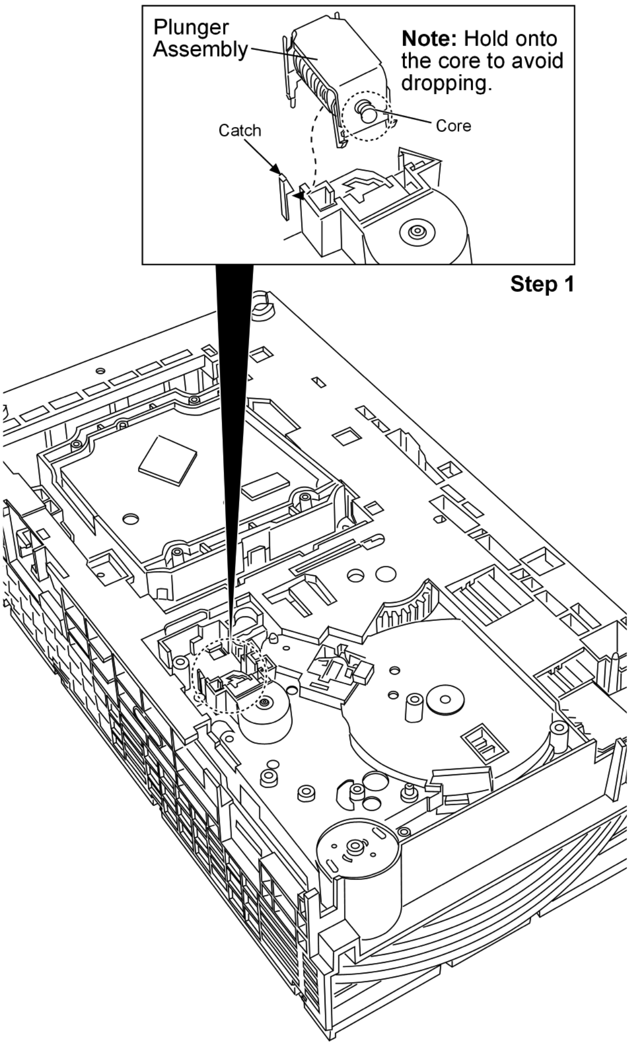
Step 11: Install the top cover, fix the top cover hook to the tray rear stopper as arrow shown.


Note:
Check that the hook is seat properly in the tray rear stopper.
Hook
Step 12
Top Cover
Claw
Claw

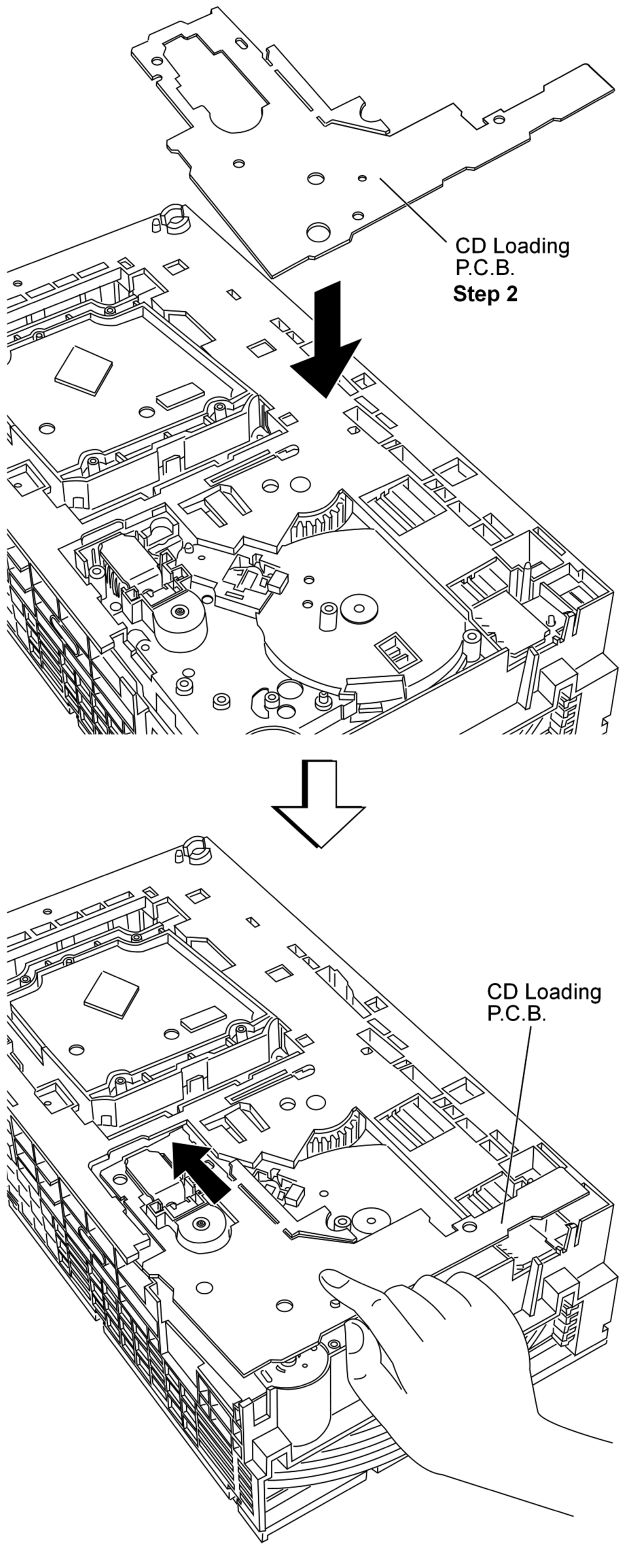
Step 12: Fix the top cover as arrow shown, the 2 claws should be latched.

The mechanism unit will be ready to be checked using service jig or be mounted to the main unit for checking.

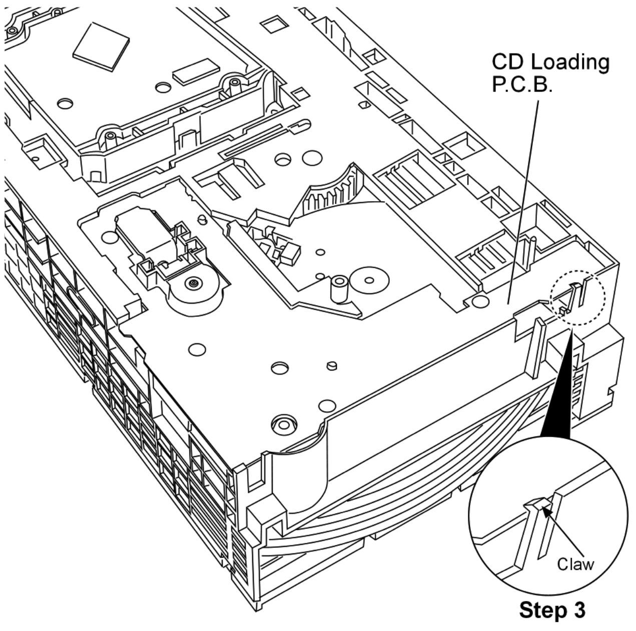
7.2.4. Assembly of CD Loading P.C.B.


Plunger Assembly
Note: Hold onto the core to avoid dropping.
Catch
Core
Step 1

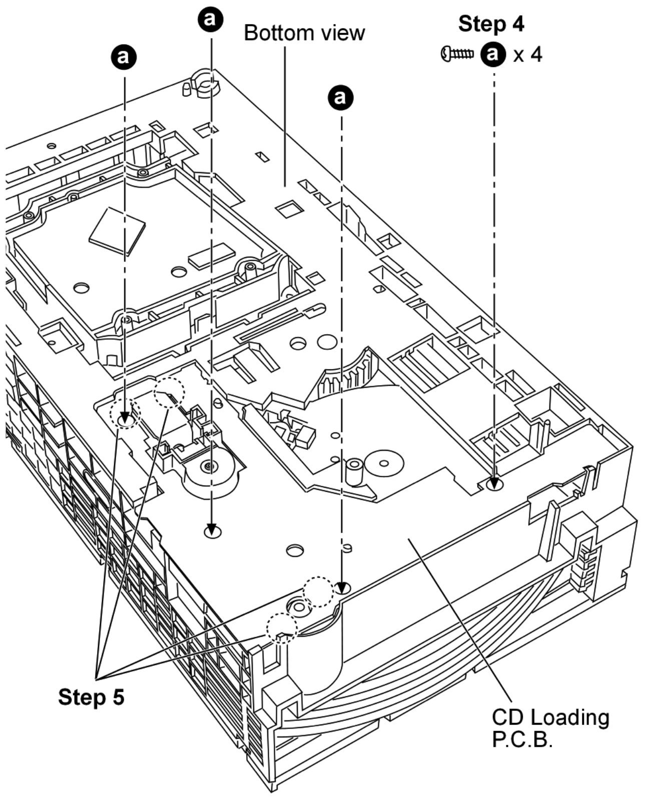
Step 1: Install the plunger assembly as arrow shown, the catch should be latched.


CD Loading
P.C.B.
Step 2
CD Loading
P.C.B.

Step 2: Install the CD Loading P.C.B. as arrows shown.


CD Loading
P.C.B.
Claw
Step 3

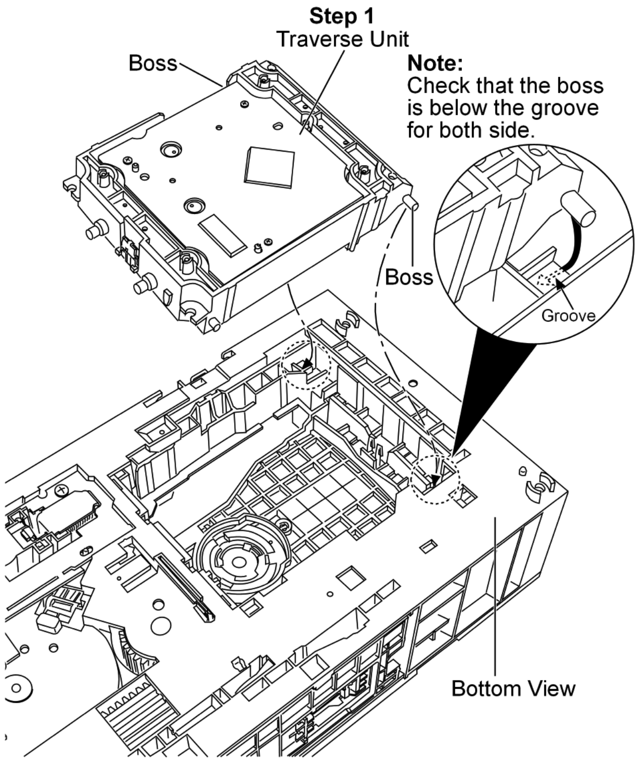
Step 3: The claw should be latched.


a
a
Bottom view
a
Step 4
a x 4
Step 5
CD Loading
P.C.B.

Step 4: Fix it with 4 screws.

Step 5: Solder the 4 points.

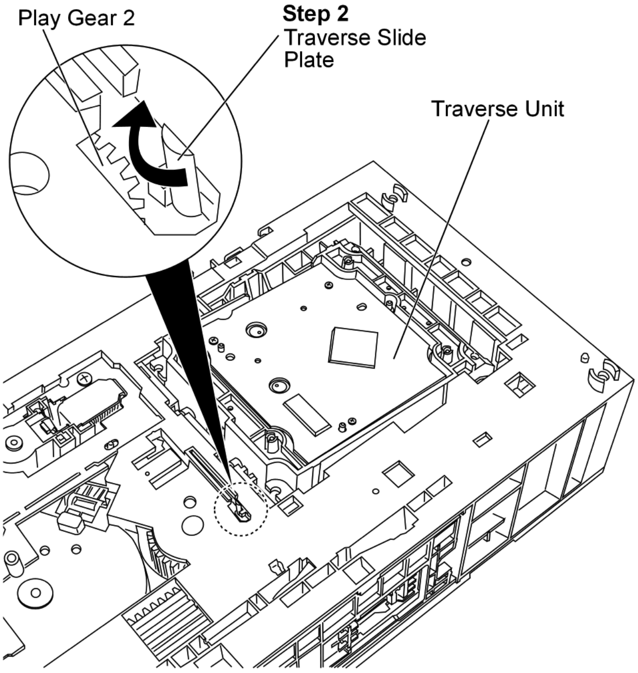
7.2.5. Assembly of Traverse Unit


Step 1
Traverse Unit
Boss
Boss
Groove
Bottom View

Note:
Check that the boss is below the groove for both side.

Step 1: Turn over the unit and install the traverse unit.

Caution:
Do not damage the Play Gear 2 when pushing the Traverse Slide Plate.


Play Gear 2
Step 2
Traverse Slide Plate
Traverse Unit

Step 2: Push the traverse slide plate as arrow shown to lock the traverse unit.

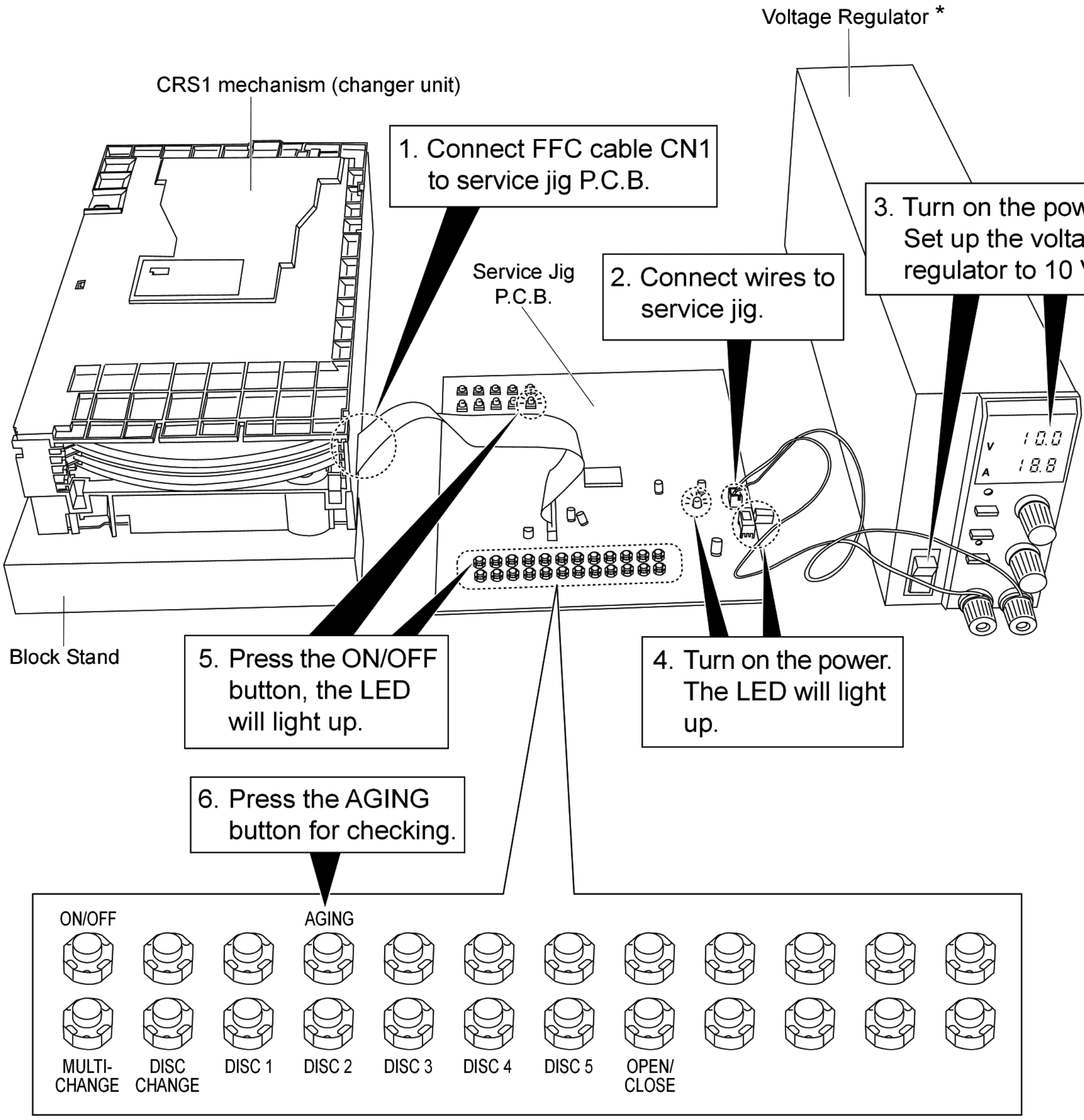
8 CRS1 (Changer Unit) Ageing / Reliability

Purpose: It is necessary to test the mechanism unit by using the Service Jig P.C.B., make sure it works in order before install it to the main unit.

8.1. Equipments

Equipments required for the set up preparation

- Voltage regulator*
- Service jig P.C.B. (RFKZ0331) [M]


Voltage Regulator *
CRS1 mechanism (changer unit)
Service Jig P.C.B.
Block Stand
V 10.0
A 18.8
ON/OFF
AGING
MULTI-CHANGE
DISC CHANGE
DISC 1
DISC 2
DISC 3
DISC 4
DISC 5
OPEN/CLOSE

1. Connect FFC cable CN1 to service jig P.C.B.
2. Connect wires to service jig.
3. Turn on the power. Set up the voltage regulator to 10 V.
4. Turn on the power. The LED will light up.
5. Press the ON/OFF button, the LED will light up.
6. Press the AGING button for checking.

* Non-supply

9 Notes of Schematic Diagram

(All schematic diagrams may be modified at any time with the development of new technology)

Note :

SW1	Open switch
SW2	Stock switch
SW3	Home switch
SW4	Top switch
SW5	Play switch

- The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
- **Importance safety notice :**

  Components identified by ⚠ mark have special characteristics important for safety. Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer´s specified parts shown in the parts list.

Caution !

IC, LSI and VLSI are sensitive to static electricity.

Secondary trouble can be prevented by taking care during repair.

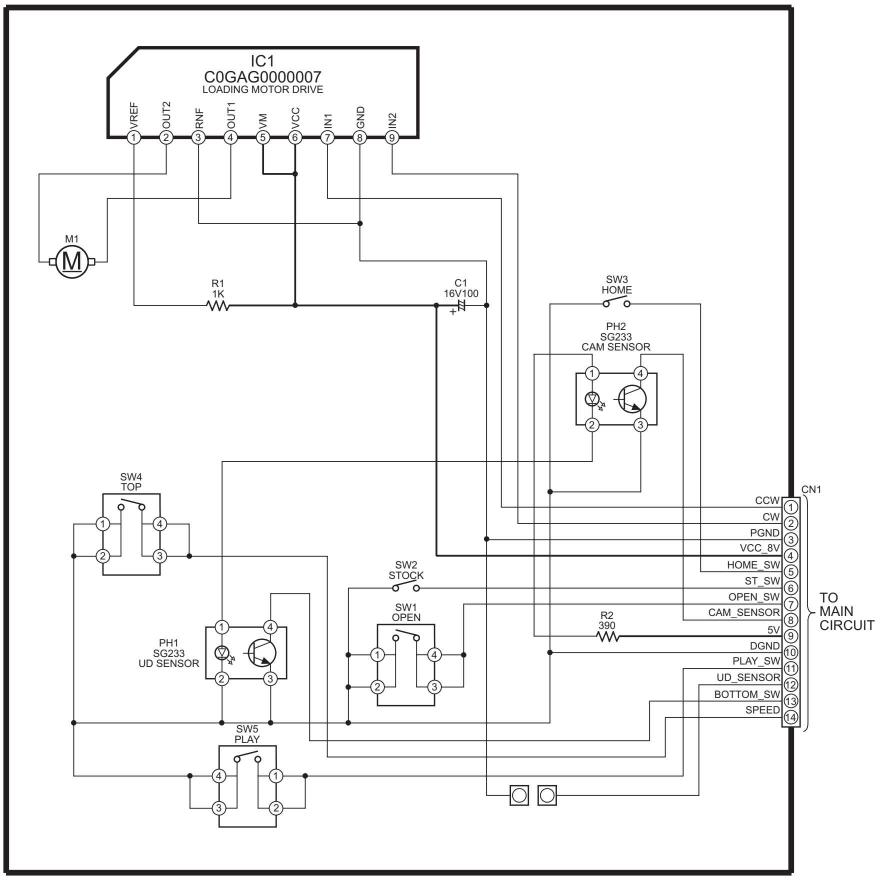
- Cover the parts boxes made of plastics with aluminium foil.
- Put a conductive mat on the work table.
- Ground the soldering iron.
- Do not touch the pins of IC, LSI or VLSI with fingers directly.

10 Schematic Diagram

10.1. CD Loading Circuit

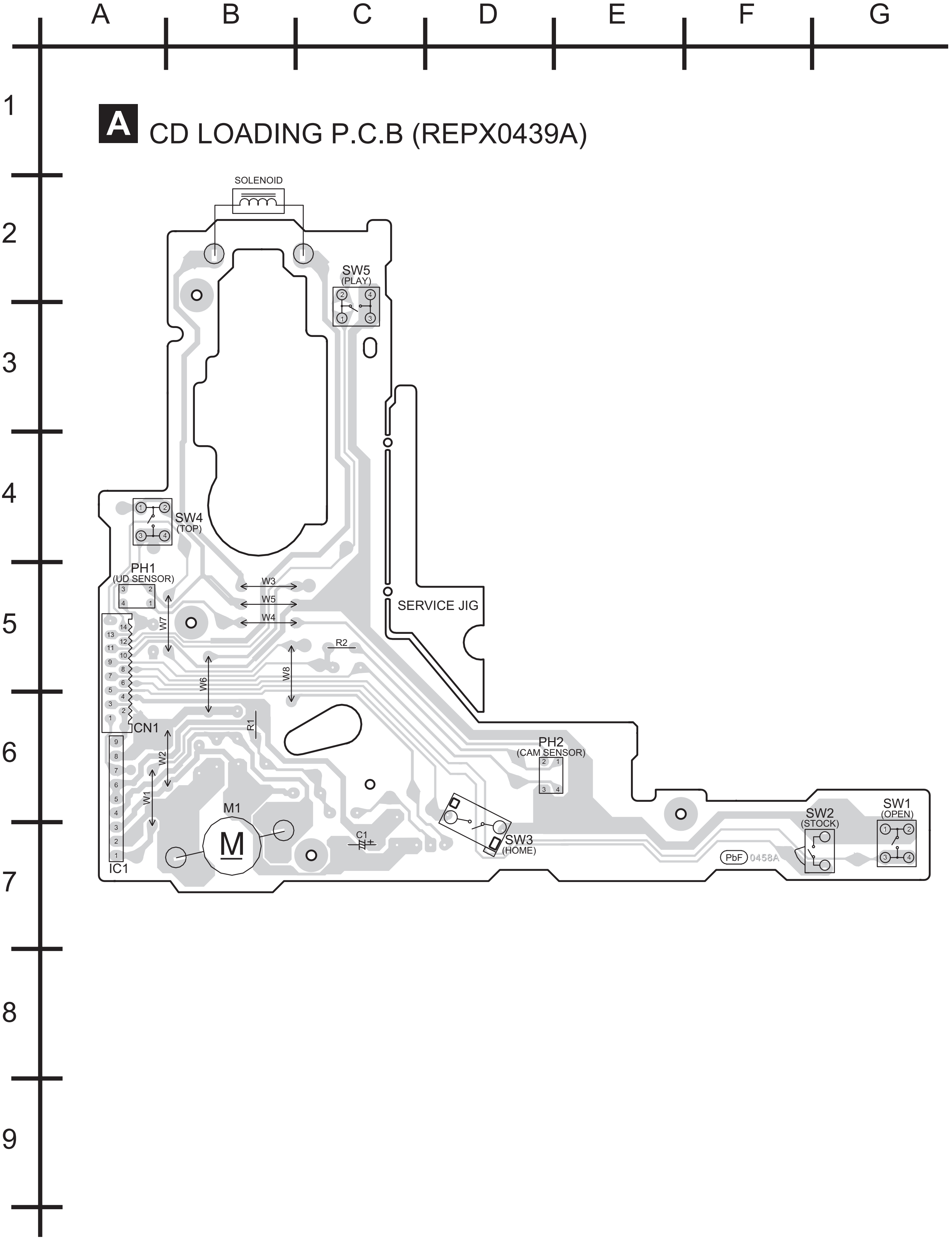
SCHEMATIC DIAGRAM - 1

CD LOADING CIRCUIT ——— : +B SIGNAL LINE


IC1
C0GAG0000007
LOADING MOTOR DRIVE
VREF
OUT2
RNF
OUT1
VM
VCC
IN1
GND
IN2
M1
M
R1
1K
C1
16V100
SW3
HOME
PH2
SG233
CAM SENSOR
SW4
TOP
SW2
STOCK
SW1
OPEN
R2
390
PH1
SG233
UD SENSOR
SW5
PLAY
CN1
CCW
CW
PGND
VCC_8V
HOME_SW
ST_SW
OPEN_SW
CAM_SENSOR
5V
DGND
PLAY_SW
UD_SENSOR
BOTTOM_SW
SPEED
TO
MAIN
CIRCUIT

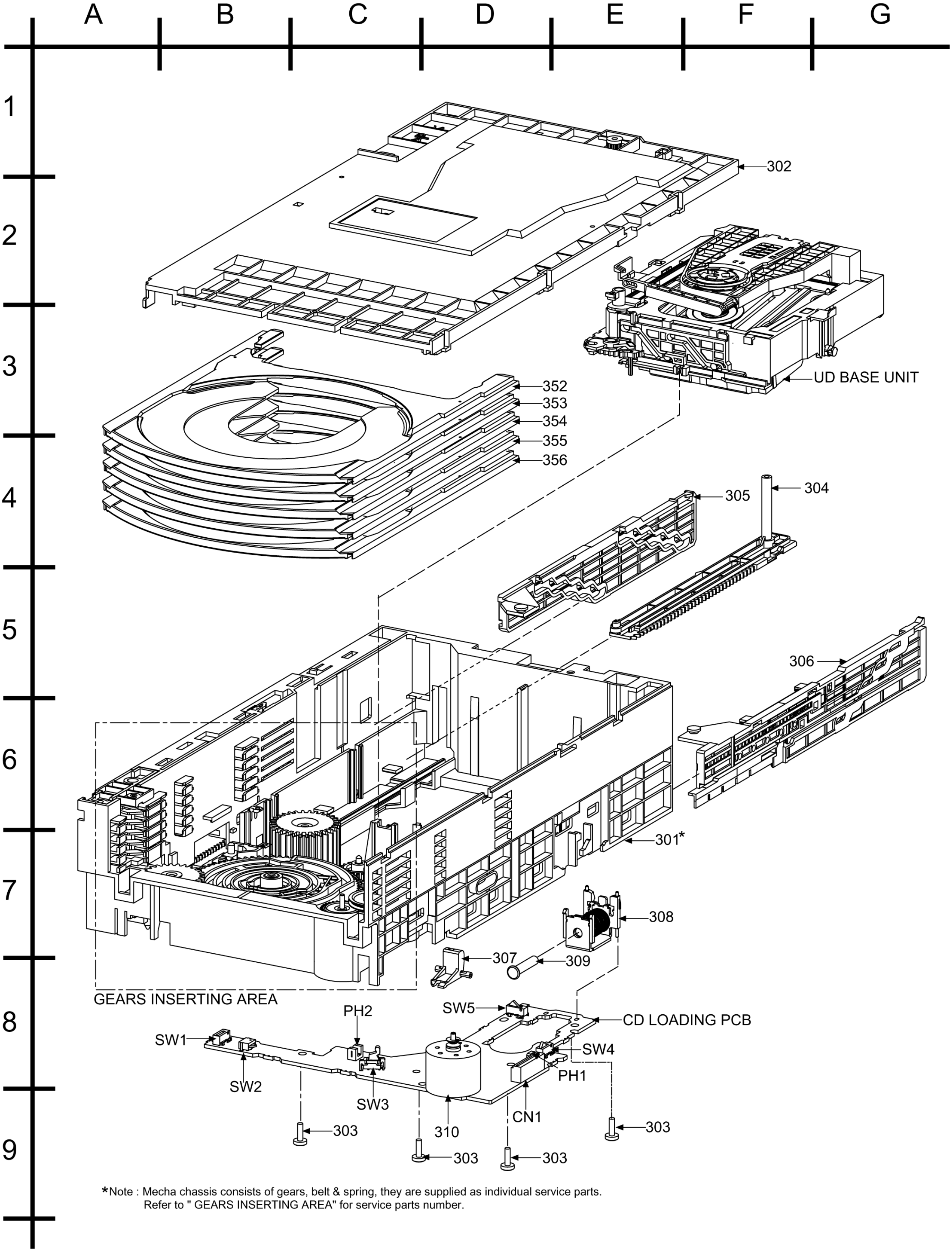
11 Printed Circuit Board

11.1. CD Loading P.C.B.

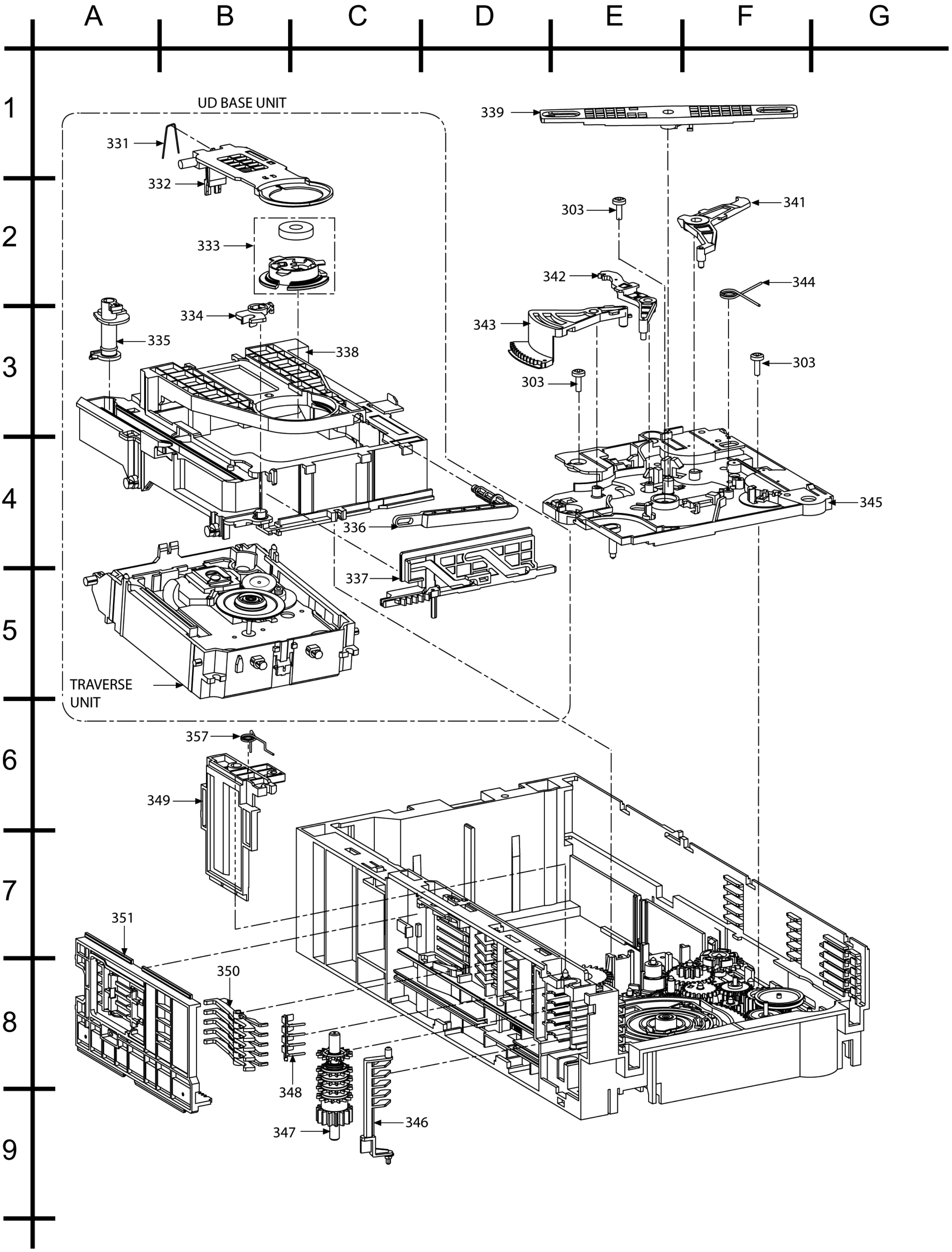

A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
A
CD LOADING P.C.B (REPX0439A)
SOLENOID
SW5
(PLAY)
SW4
(TOP)
PH1
(UD SENSOR)
W3
W5
W4
W7
W6
W8
R2
R1
SERVICE JIG
CN1
W2
W1
IC1
M1
M
C1
PH2
(CAM SENSOR)
SW3
(HOME)
SW2
(STOCK)
SW1
(OPEN)
PbF
0458A

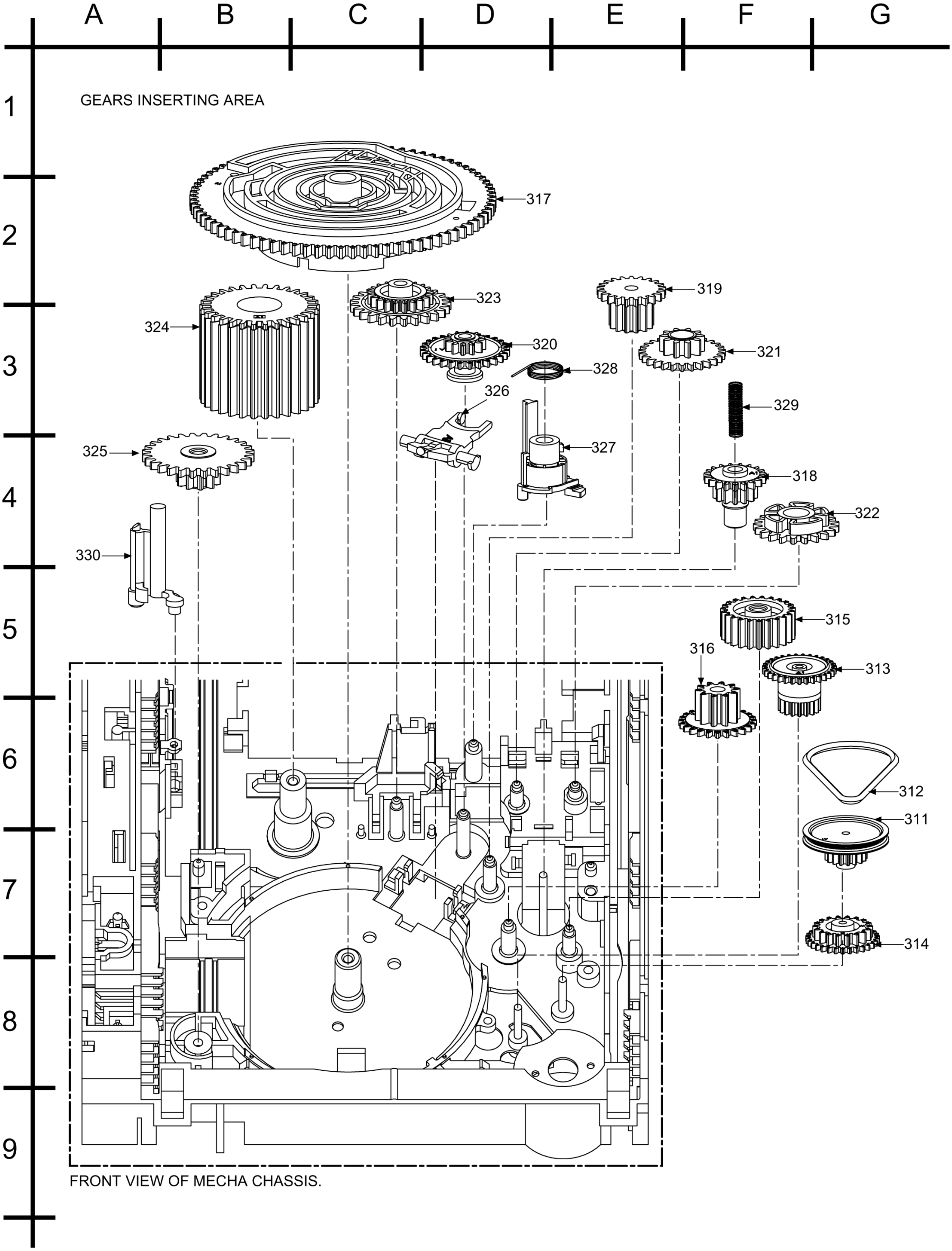
12 Exploded Views

12.1. CD Loading Mechanism


A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
302
UD BASE UNIT
352
353
354
355
356
304
305
306
301*
308
307
309
GEARS INSERTING AREA
PH2
SW5
CD LOADING PCB
SW1
SW4
PH1
SW2
SW3
CN1
303
310
303
303
303
303

*Note : Mecha chassis consists of gears, belt & spring, they are supplied as individual service parts.
Refer to " GEARS INSERTING AREA" for service parts number.


A
B
C
D
E
F
G
UD BASE UNIT
TRAVERSE UNIT


A
B
C
D
E
F
G
GEARS INSERTING AREA
FRONT VIEW OF MECHA CHASSIS.

13 Replacement Parts List

Notes:

- Important safety notice:

  Components identified by ⚠ mark have special characteristics important for safety.

  Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.

  When replacing any of these components, be sure to use only manufacturers's specified parts shown in the parts list.
- Capacitor values are in microfarad (μF) unless specified otherwise, P=Pico-farads(pF); Farads.
- Resistance values are in ohms, unless specified otherwise, 1K=1,000(ohms).
- The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.
- [M] Indicates in the Remarks columns indicates parts that are supplied by **PAVCSG**.

13.1. CD Loading Mechanism Parts List

Ref. No.	Part No.	Part Name & Description	Remarks
		TRAVERSE DECK	
301	RFKJAA340PS	MECHA CHASSIS ASS'Y	[M]
302	RMLX0029	TOP COVER	[M]
303	XTB3+8JFJ	SCREW	[M]
304	RMMX0008	TRAY DRIVE RACK	[M]
305	RMMX0009	UD RACK L	[M]
306	RMMX0010-1	UD RACK R	[M]
307	RMLX0027	PLUNGER LEVER	[M]
308	RMS0398-1	MOVING CORE	[M]
309	RAQX0001-V	PLUNGER ASS'Y	[M]
310	REMX0001	MOTOR UNIT	[M]
311	RDGX0017	PULLEY GEAR	[M]
312	RDVX0001	BELT	[M]
313	RDGX0018	RELAY GEAR 1	[M]
314	RDGX0019	RELAY GEAR 2	[M]
315	RDGX0038	RELAY GEAR 3	[M]
316	RDGX0037	MAIN DRIVE GEAR	[M]
317	RDGX0022	CAM GEAR	[M]
318	RDGX0023	SWITCHING GEAR	[M]
319	RDGX0024	LONG GEAR	[M]
320	RDGX0025	FUNCTION GEAR	[M]
321	RDGX0026	UD GEAR 1	[M]
322	RDGX0027	UD GEAR 2	[M]
323	RDGX0028	PLAY GEAR 1	[M]
324	RDGX0029	PLAY GEAR 2	[M]
325	RDGX0031-1	TRAY RELAY GEAR	[M]
326	RMLX0024	FUNCTION LEVER	[M]
327	RMLX0033	PLAY SWITCH LEVER	[M]
328	RMBX0044	PLAY LEVER SPRING	[M]
329	RMBX0040	CHANGE GEAR SPRING	[M]
330	RMLX0032	PLAY LEVER B	[M]
331	RMBX0041	CLAMPER SUPPORT PLAT	[M]
332	RMMX0011	CLAMPER SUPPORT PLAT	[M]
333	RXQX0021	CLAMPER UNIT	[M]
334	RMLX0031	PLAY LEVER A	[M]
335	RMLX0025	TRAY CATCH LEVER	[M]
336	RMLX0034	TRAY REAR STOPPER	[M]
337	RMMX0007-1	TRV SLIDE PLATE	[M]
338	RMRX0057-1	UD BASE	[M]
339	RMLX0028	UD CONNECTION LEVER	[M]
341	RMLX0036	LOCK LEVER 2	[M]
342	RMLX0035	LOCK LEVER 1	[M]
343	RDGX0030	TRIGGER GEAR	[M]
344	RMBX0043	LIMIT SPRING	[M]
345	RMQX0132-1	PITCH PLATE	[M]
346	RMLX0026	OPEN SW LEVER	[M]
347	RXQX0019	OC GEAR UNIT	[M]
348	RMCX0031	OC GEAR SPRING	[M]
349	RMQX0133-1	GEAR COVER	[M]
350	RMLX0030	TRAY LOCK LEVER	[M]
351	RMMX0006	TRIGGER SLIDE PLATE	[M]
352	RMRX0056A-1	TRAY 1	[M]
353	RMRX0056B-1	TRAY 2	[M]
354	RMRX0056C-1	TRAY 3	[M]
355	RMRX0056D-1	TRAY 4	[M]
356	RMRX0056E-1	TRAY 5	[M]
357	RMEX0042	OPEN LEVER SPRING	[M]

13.2. Electrical Parts List

Ref. No.	Part No.	Part Name & Description	Remarks
		PRINTED CIRCUIT BOARD	
	REPX0439A	CD LOADING P.C.B.	[M] (RTL)
		INTEGRATED CIRCUITS	
IC1	C0GAG0000007	IC DRIVER	[M]
		SWITCHES	
SW1	RSH1A045-1A	SW OPEN	[M]
SW2	K0L1BA000117	SW STOCK	[M]
SW3	K0L1BA000086	SW HOME	[M]
SW4	K0L1BA000078	SW TOP	[M]
SW5	K0L1BA000078	SW PLAY	[M]
		CONNECTORS	
CN1	K1MN14A00049	14P FFC CONNECTOR	[M]
PH1	B3NAA0000004	PHOTOSENSOR	[M]
PH2	B3NAA0000004	PHOTOSENSOR	[M]
		RESISTORS	
R1	D0AE102JA048	1K 1/4W	[M]
R2	D0AE101JA048	100 1/4W	[M]
		CAPACITORS	
C1	ECEA1CKA101B	100 16V	[M]